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**TOBACCO AND INJURY:
AN ANNOTATED BIBLIOGRAPHY**

**U S ARMY RESEARCH INSTITUTE
OF
ENVIRONMENTAL MEDICINE
Natick, Massachusetts**

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13. ABSTRACT (Maximum 200 words) The role of tobacco use in cardiovascular diseases, cancers, and other disorders has been well documented, and now injuries can be added to the long list of tobacco's health consequences. Unlike cardiovascular disease and cancer, for which the latency of disease may be decades, the risk of injury associated with tobacco use may be measured in months, days, or even hours. Smokers are generally believed to be greater risk-takers, are heavier users of alcohol, and are more frequently diagnosed with depression and schizophrenia. They have been shown to have impaired healing of wounds and fractures, as well as chronic demineralization of bone, potentially increasing their susceptibility to fractures. Smoking has also been linked to an increased risk of musculoskeletal overuse injuries, motor vehicle accidents, industrial accidents, poisoning, low back and shoulder pain, burns and fire deaths, and suicide. Recent Army studies have documented higher musculoskeletal injury rates among smokers. While evidence mounts implicating smoking as an injury risk factor, the association between injury and smokeless tobacco is less consistent. This annotated bibliography includes references, abstracts and comments on over 350 journal articles, letters to the editor, technical reports, and dissertations.				
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AN ANNOTATED BIBLIOGRAPHY**

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INTRODUCTION

The purpose of this bibliography is to provide a foundation for the continued scientific study of tobacco use and injury. The references are preceded by an overview of the literature, and a brief discussion of potential mechanisms for tobacco's role in injury causation. Figure 1, which follows page 4, provides a graphical representation of these complex relationships. Methods that might be used to unravel the mysteries inherent in this puzzling association are also suggested. Citations made within the front text refer, by number, to the references listed alphabetically in the complete bibliography. When available, abstracts follow each reference. In selected cases, comments are also included.

BACKGROUND

The highly trained men and women in the military are charged with nothing less than the security of our nation. They are continually being placed in harm's way; whether facing an enemy in battle, piloting a high performance aircraft, driving a tank, jumping from an airplane, fast-roping from a helicopter, or simply driving a car home from work. Because they are frequently confronted with so many hazards, it is imperative that they perform to the maximum level of their physical and mental capabilities. Evidence from laboratory and field studies suggests the use of tobacco products alters physical and cognitive functioning and thus may significantly influence a soldier's ability to perform safely and effectively (10, 11, 27, 78, 90, 169, 279, 280, 297, 337). While there is conflicting evidence that nicotine can improve performance on simple psychomotor tasks (148, 208, 271, 272, 284, 297, 332), nicotine appears to have a negative effect on more complex functioning (126, 304, 306, 307, 308, 309, 334).

Tobacco use among active duty Army men and women remains at high levels, while the use of smokeless tobacco is increasing (54). The role of tobacco use in cardiovascular diseases, cancers, and other disorders has been well documented (296), and now injuries can be added to the long list of tobacco's health consequences (290). Unlike cardiovascular disease and cancer, in which the latency of tobacco's influence may be decades, the risk of injury associated with tobacco use may be measured in months, days, or even hours. It may be easier to discount an adverse consequence of smoking if it is decades away. But, perhaps soldiers will reevaluate their habits if they learn that there are immediate and serious consequences of smoking.

Smokers are generally believed to be greater risk-takers (79, 86, 90), are heavier users of alcohol (54, 230), and are more frequently diagnosed with depression

and schizophrenia (131, 142, 351). They have been shown to have impaired healing of wounds and fractures (4, 6, 67b, 73, 88, 93, 128, 168, 191, 204, 231, 236, 298), as well as chronic demineralization of bone (76, 106, 107, 165, 200, 300), potentially increasing their susceptibility to fractures. Smoking has also been linked to an increased risk of musculoskeletal overuse injuries (78, 169, 179, 279, 280), motor vehicle accidents (57, 81, 82, 86, 101, 104, 105, 127, 129, 209, 309, 321, 329), industrial accidents (92, 181, 237, 238, 244, 322, 340, 349), poisoning (85-87, 142), low back pain (32, 33, 42, 49, 79, 110, 111, 137, 138, 248, 291, 340), shoulder pain (221, 311, 340), burns (58, 256), fire deaths (60, 227), suicide (142, 253, 285, 286), and violence (285). Even injuries among infants are more common if their mothers smoke (133). Undoubtedly, additional associations will emerge from research in progress.

Recent military studies have documented higher musculoskeletal injury rates among smokers (90, 186, 248). Investigators in the Occupational Medicine Division at USARIEM have now reported multiple populations in which smokers have been at consistently greater risk of musculoskeletal injury (10, 11, 78, 106, 107, 169, 279, 280, 337, 340). These associations persist even among individuals experiencing similar exposures to risks and who are living in highly controlled environments. While evidence mounts implicating smoking as an injury risk factor, the association between injury and smokeless tobacco is less consistent (11, 280). A better understanding of these complex relationships may eventually benefit smokers as well as non-smokers exposed to second-hand smoke.

DISCUSSION

The use of tobacco products may be related to a number of psychosocial and physiological factors capable of altering injury risk. For the purpose of discussion, these factors have been divided into two general categories: (1) increased *exposure* to hazards and (2) increased tissue *susceptibility* to injury for a given hazard (see Figure 1).

INCREASED EXPOSURE TO HAZARDS

Exposure to hazards is influenced by one's occupation, socioeconomic status, recreational activities, personality factors (e.g., risk-taking behavior), the use of drugs and alcohol, and the integrity of cognitive and neuromuscular processes required for detection and avoidance of hazardous situations. Use of tobacco products may also impair one's ability to react appropriately to dangerous situations. Examples include decreased concentration due to nicotine withdrawal (39, 134, 274) and decreased night vision (347) due to elevated serum carbon monoxide levels. Smokers have

been shown to have difficulty with complex tasks and long-term memory -- whether they are in a deprived state or not (304). Deprived smokers exhibit a host of symptoms that are almost certainly inconsistent with maximum performance. Yet, basic trainees are allowed few opportunities to smoke for the duration of training. Smoking is also prohibited in military vehicles and aircraft. From this, we could conclude that drivers and pilots who are smokers are operating military vehicles and aircraft in a state of withdrawal. The ramifications of this have not been adequately studied. A similar circumstance exists for military parachutists who cannot smoke in the vicinity of parachutes or aircraft. Many of them compensate by chewing tobacco. This may reduce nicotine's withdrawal effects, but would have little impact on the more chronic effects of smoking (i.e., decreased oxygen carrying capacity of the blood due to carbon monoxide exposure).

INCREASED SUSCEPTIBILITY TO INJURY FOR ANY GIVEN HAZARD

Physiological factors, acting at the tissue level, may be responsible for increased susceptibility to injury. Smokers may be at higher risk for "overuse injuries" due to a compromised ability to repair damaged tissues. For example, elevated carbon monoxide levels impede tissue oxygen delivery (314, 315). Also, nicotine causes constriction of blood vessels inhibiting blood supply before and after injury (4, 339). It also affects neuromuscular junction activity, increasing muscle tone (243, 308). Smoking may also lead to vitamin deficiencies (324), which in turn impair collagen synthesis (necessary for tissue repair) and which reduce the ability to prevent tissue damage caused by free radicals (94). Overuse injuries (more prevalent among smokers) are believed to occur when the body's repair mechanisms are unable to cope with minor but continual trauma. Wound healing and recovery from surgery, as mentioned previously, have been shown to be compromised in smokers. Perhaps these two phenomena have a similar etiology.

Ideas for future research

Elimination of confounders in injury research is a tremendous challenge. Many studies of smoking and injury have relied upon self-reported measures of physical activity, smoking, drinking and drug use; others have simply been unable to obtain this information. In many longitudinal studies, smoking habits are determined at a time not in proximity to the time of injury. It will be necessary to perform large, well-controlled, prospective studies to adequately characterize smokers and non-smokers, and to accurately ascertain injury outcomes. In this way, the influence of the following various cofactors can be isolated: socioeconomic status, education, gender, access to medical care, occupational and recreational exposure, and concurrent medical conditions such as diabetes or cardiovascular disease.

Many studies indicate that smokers are injured more often than non-smokers. We cannot be certain whether smokers, by virtue of their behavior, expose themselves

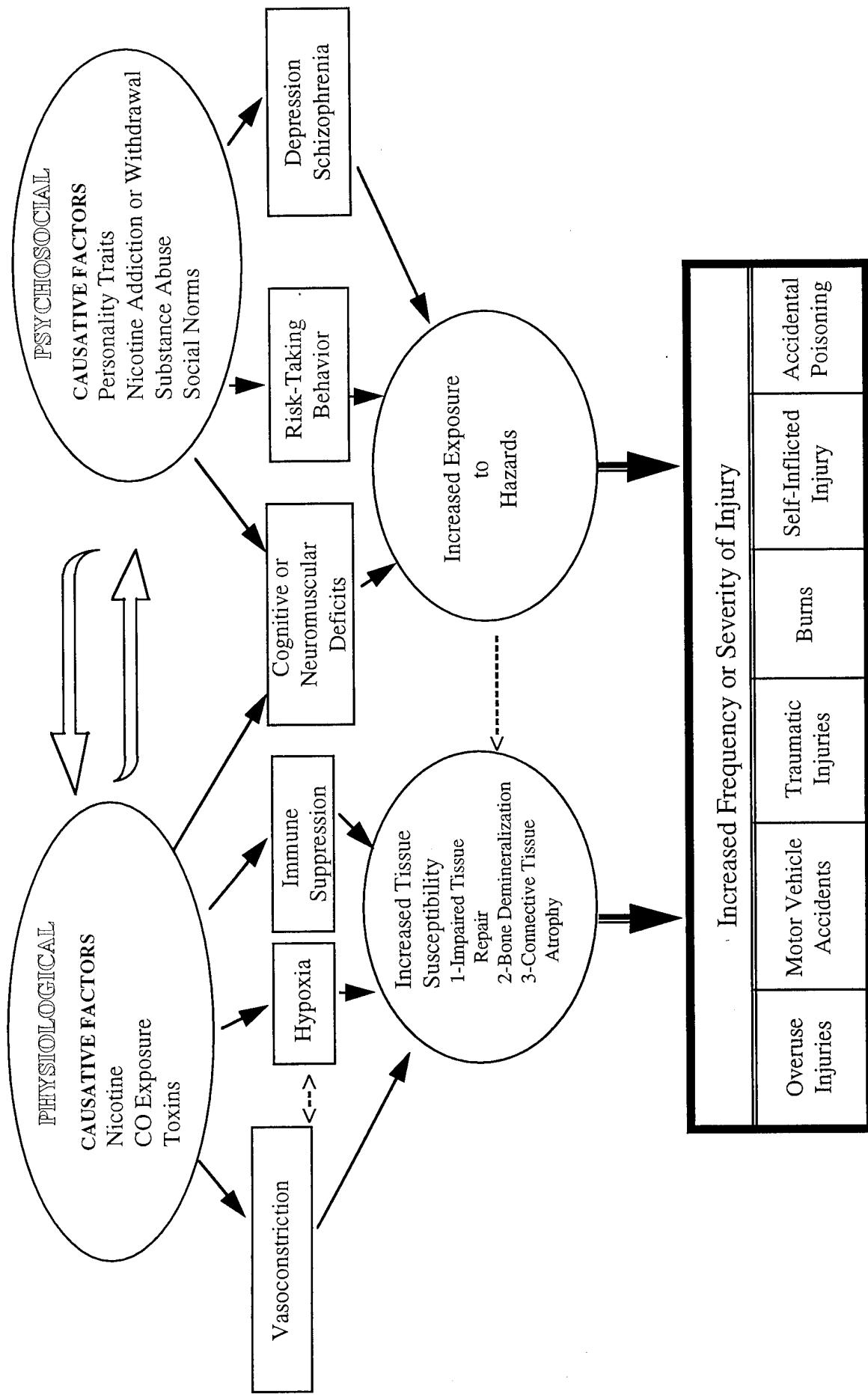
to greater risks, or if they are simply more susceptible to injury. Risk-taking behavior, such as the decision not to wear seat belts, or not to obey speed limits, appears to be more prevalent among smokers. One way to differentiate injury susceptibility from exposure may be to look at injury severity and recovery time for smokers and non-smokers who are involved in the same accident -- perhaps matched pairs of drivers and passengers or pilots and co-pilots.

To examine the specific effects of tobacco by-products such as nicotine, one could compare low-nicotine cigarette users to regular cigarette users, or contrast users of chewing tobacco and snuff (who presumably have nicotine exposure but not carbon monoxide exposure) to non-tobacco users. On the other hand, to isolate the effects of carbon monoxide, one could compare pipe and cigar smokers (who tend to receive higher doses of carbon monoxide) with cigarette smokers, or examine non-smoking workers who are exposed to carbon monoxide (i.e., highway toll collectors) to smokers and unexposed non-smokers.

CONCLUSIONS

The evidence strongly supports a primary and independent influence of smoking on injury risk. Given the diverse circumstances in which tobacco users are found to be at higher risk of injury, it appears likely that these effects are multi-factorial. Growing evidence of adverse behavioral characteristics and cognitive deficits among smokers requires further study to define the role of these factors in accident causation. There is also sufficient evidence of increased tissue level susceptibility among smokers to support the relationship between tobacco and overuse injuries. The implications of these findings are indeed provocative. Uncovering the mechanism of these relationships may yield tools for reducing injuries among smokers and perhaps non-smokers who are at risk from passive smoke in their environment. Additional scientific evidence of immediate harm from tobacco use might also "tip the balance" in convincing soldiers to stop smoking.

FIGURE 1: POTENTIAL MECHANISMS FOR INCREASED INJURY RISK AMONG SMOKERS



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2. Acri, J.B. and Grunberg, N.E. A psychophysical task to quantify smoking cessation-induced irritability: the reactive irritability scale (RIS). Addict Behav 17(6):587-601, 1992.

ABSTRACT: A psychophysical rating scale using magnitude estimation was developed as a tool to quantify irritability as one index of drug withdrawal. The scale measures reactive irritability by using environmental sounds as probes. Three studies are described in which target and reference stimuli are selected, tested for reliability, and presented to cigarette smokers abstaining from smoking, cigarette smokers who are not abstaining, and non-smokers. This reactive irritability scale (RIS) was found to have test/re-test reliability and content validity. The RIS significantly differentiated abstaining smokers from non-smokers and from smokers allowed to smoke, whereas the commonly used self-report measures of irritability failed to distinguish the two groups of smokers. By measuring irritability as a type of reactivity rather than as a static attribute, a different type of irritability is measured than that which is assessed by self-report questionnaires. The RIS should be used in the study of withdrawal from nicotine and other drugs of abuse.

COMMENT: *In this study a reactive irritability scale (RIS) was developed to assess the level of irritability among nonsmokers, smokers, and smokers who had abstained for 12 hours prior to testing. This test used a series of common environmental sounds to test subjects' irritability. Subjects were also administered questionnaires which requested self-reports of level of irritability. These questionnaires included the Signs and Symptoms of Tobacco Withdrawal (SSTW) questionnaire, the Profile of Mood States (POMS) questionnaire, the Beck Depression Inventory, the Irritability, Depression and Anxiety (IDA) scale, and the Shiffman-Jarvik withdrawal scale. Only the RIS was able to distinguish between the smokers who had abstained and those who had not. The authors suggest that the self-report measures may not have been able to distinguish between the smokers who had abstained and those who had not because smokers as a group tend to have greater "trait" irritability. They suggest that a habitual smoker may be experiencing a series of withdrawal symptoms between cigarettes on a daily basis, this would certainly make them more irritable and over time they may come to see themselves as more irritable. (JAB)*

3. Adams, J.R. and Williams, B.E. The association between smoking and accidents: Overdependency as an influencing variable. Traffic Quarterly :583-588, 1966.

COMMENTS: *This article reported higher accident rates among smokers in a group of 1,025 male insurance applicants between the ages of 18-25. The population was divided into two samples for unclear statistical purposes. In the first subsample (n=513) 18.6% of the no accident group smoked, 32.9% of the median accident group smoked, and 54.3% of the high accident-violation group smoked. In the second subsample (n=512) 15.9% of the no accident group smoked, 25.8% of the median accident group smoked, and 37.5% of the high accident-violation group smoked. (PJA)*

4. Akef, J., Weine, F.S., Maywood, I. and Weissman, D.P. The role of smoking in the progression of periodontal disease: A literature review. Compendium of Continuing Education in Dentistry 13(6):529-536, 1992.

ABSTRACT: The purpose of this article is to present an explanation for the possible association between

smoking and the progression of periodontal disease. The report discusses one study that harvested polymorphonuclear leukocytes (PMNs) from gingival crevices of smokers and non-smokers and reported that the phagocytic capability of the PMNs for smokers was less than for non-smokers. Smoking 1 hour before collection of PMNs further reduced phagocytic function of the leukocytes. The authors also report that nicotine from cigarettes stimulates the sympathetic ganglia and adrenal medulla to produce neurotransmitters, including epinephrine, norepinephrine, and catecholamine. These affect the alpha receptors on blood vessels, which in turn causes vasoconstriction. Another study stated that smokers accumulated less plaque formation than non-smokers, but smokers showed increased susceptibility to periodontal disease, and, even worse, an increased rate of alveolar bone loss. The authors concluded that the results suggested impaired healing of surgical therapy among heavy smokers. Perhaps some of the newer tests such as the DNA-probe, ELISA (enzyme-linked immunosorbent assay), or similar diagnostic tools, will show the effects of smoking at a cellular level more definitively and will help the clinician understand the correlation of smoking to periodontal disease.

COMMENTS: *This report has a good discussion on the effect of smoking tobacco on immune suppression and vasoconstriction. (KLR)*

5. al Ghazal, S.K., McKiernan, M., Khan, K. and McCann, J. Results of clinical assessment after primary digital nerve repair. J Hand Surg [Br] 19(2):255-7, 1994.

ABSTRACT: We have carried out a retrospective study of 88 consecutive digital nerve repairs in 84 patients who presented to this department between September 1989 and September 1991. 94% of the patients were operated on within 24 hours of the injury, and the nerves were repaired using magnifying loupes (x 4.5). 71 patients were assessed clinically 8 to 32 months post-operatively. 17% of the patients had excellent results, 51.1% good results, 22.8% fair results and 9.1% had poor results. Close correlation between age and recovery of sensation and between smoking and nerve recovery were found. Results were better in nerves that were cut cleanly (64.3% were excellent/good) than in crushed nerves (28.1%). Without the availability of an operating microscope, loupes give a satisfactory result in nerve repair, and this study compares well with reported series.

COMMENTS: *This study included 84 subjects who underwent digital nerve repair. Forty-nine patients were nonsmokers and thirty-five were smokers. Among nonsmokers 43 of 49 (87%) had excellent or good results, in contrast, only 15 of 35 smokers (42%) had excellent or good results. In addition, young age was a predictor of a good outcome. Four out of the five children under age twelve had excellent outcomes while the fifth had a good outcome. The authors did not report any stratified or multivariate analysis. Unfortunately the inclusion of five children under the age of twelve in the analysis of smoking may have confounded the reported results. It is probable that those children increased the number of good outcomes in the nonsmoking group. Without knowledge of the age distribution of the other subjects it is difficult to guess to what extent age may have confounded the relationship between smoking and positive outcome from digital nerve repair. (JAB)*

6. al Qattan, M.M. and Bowen, V. Effect of preexisting health conditions on the results of reconstructive microvascular surgery. Microsurgery 14(3):152-7, 1993.

ABSTRACT: The effect of different preexisting health conditions on the results of reconstructive microvascular surgery are reviewed. These conditions include: age, vital organ failure, diabetes, arterial and venous diseases, medications, smoking, wound healing disorders, epidermolysis bullosa, hematological diseases, multiple injury patients, pregnancy, and neuropsychiatric disease.

COMMENT: *Several health conditions are discussed in relation to their effect on reconstructive microvascular surgery outcomes. It is recommended that smoking be prohibited perioperatively because nicotine is a potent vasoconstrictor. Evidence suggests that the failure rate in patients who chronically smoke but quit during the perioperative period is comparable to the failure rate among nonsmokers. However, the smokers will have delayed wound healing. (JAB)*

7. Alexander, C.S., Ensminger, M.E., Somerfield, M.R., Young, K.J. and Johnson, D.E. Behavioral risk factors for injury among rural adolescents. Am J Epidemiol 136(6):673-685, 1992.

ABSTRACT: This 3-year, longitudinal, prospective study examined behavioral risk factors for medically attended injuries among a cohort of 758 rural students from Maryland's Eastern Shore region who were 12-14 years of age in 1987. Students were surveyed annually in the eighth, ninth, and tenth grades with a self-administered questionnaire. Information was obtained on the number of injuries experienced, risk-taking behaviors, delinquency, alcohol and drug use, physical exercise and sports, parental supervision, and work experience. Information on the parents' education was obtained from parental interview. Slightly more than half (53.5%) of the students reported having experienced one or more injuries in the eighth grade as compared with one-third of the students in the ninth grade, and 38% of those in the tenth grade. Poisson regression analyses were conducted to examine the association of eighth grade variables with ninth grade injuries and ninth grade variables with tenth grade injuries. Results from these analyses indicated that, in addition to sex and race, a high degree of risk taking, frequent cruising, and having high and low parental supervision in the eighth grade significantly increased the number of injuries in the ninth grade. In the tenth grade, risk taking continued to be associated with injuries. In addition, students who reported disciplinary problems in school, working 1-10 hours per week, drinking on 1-2 days during the past month, lifetime use of marijuana equal to 1-5 occasions, and involvement in sports experienced greater numbers of injuries in the tenth grade.

COMMENTS: *Cigarette smoking was not mentioned in this article, but other risk-taking behaviors were. (JAB)*

8. Allen, J. and Mazzuchi, J. Alcohol and drug abuse among American military personnel: prevalence and policy implications. Mil Med 150(5):250-255, 1985.

ABSTRACT: Initial data analyses of the 1982 Worldwide Survey of Drug and Alcohol Use Among Military Personnel have now been completed. The Worldwide Survey is conducted recurrently among servicemembers and is used as the primary means for monitoring the extent and impact of drug and alcohol abuse. The present survey was conducted by Research Triangle Institute. Findings derived from the study assist the Health Affairs in responding to concerns of congress, medical and personnel military program managers as well as the general public. The survey also serves as an important basis for DoD in developing policies to prevent drug and alcohol abuse and to treat personnel with the problems. The present article will summarize major conclusions of the 1982 survey, comment on differences between these findings and those of the previous survey, address possible modifications to be made in subsequent surveys, and discuss some of the policy implications of results from the 1982 survey.

COMMENTS: *Rates of use are given for alcohol and other drugs, but not cigarette smoking. (JAB)*

9. Ames, R.G. and Trent, R.B. Respiratory predictors of disability days: a five year prospective study of U.S. coal miners. Am J Ind Med 7(4):337-42, 1985.

ABSTRACT: A 5-year prospective analysis tests the hypothesis that coal miners who have impaired respiratory health also experience greater numbers of disability days due to occupational injury. Occupational and respiratory health information collected for the period 1977 through 1981 by the

National Institute for Occupational Safety and Health (NIOSH) on 1,118 U.S. underground coal miners was linked to coal miner injury records collected under a mandatory reporting system by the Mine Safety and Health Administration (MSHA). Respiratory impairment, based on spirometric measures, and a questionnaire measure of chronic bronchitis symptoms, after adjustment for cigarette smoking and total years of underground mining, did not provide statistically significant prediction of average disability days. In addition, respiratory impairment did not predict the number of episodes of occupational injuries resulting in days lost from work.

10. Amoroso, P.J., Reynolds, K.L. and Dettori, J.R. A Review of the Relationship Between Tobacco Use and Musculoskeletal Injury. Third International Conference for Injury Prevention and Control, Melbourne, Australia, 1996.

ABSTRACT: PURPOSE: 1. To review the relationship between smoking and musculoskeletal injury, and 2. To discuss potential mechanisms for tobacco's role in injury causation. BACKGROUND: The role of tobacco in the morbidity and mortality due to cardiovascular disease, cancer, and other disorders is well documented. Smokers have impaired healing of wounds and fractures, as well as chronic demineralization of bone that increases susceptibility to fractures. Recent Army studies show higher musculoskeletal injury rates among smokers. Smoking has been shown to be a significant risk factor for occupational injuries among postal workers, and for back injuries among other workers. DISCUSSION: The use of tobacco products appears to be related to a number of physiological and psychosocial factors capable of altering injury risk. These factors can be divided into two general categories: 1. Increased exposure to hazards, and 2. Increased susceptibility to injury for any given hazard. Exposure to hazards is influenced by personality factors such as risk-taking behavior, and the propensity for the use of drugs and alcohol. Use of tobacco products may also impair one's ability to react to hazards. Examples include decreased concentration ability due to nicotine withdrawal and decreased night vision due to elevated serum carbon monoxide levels. Physiological factors, acting at the tissue level, may be responsible for increased susceptibility to injury. Smokers may be at higher risk for "overuse injuries" due to a compromised ability to repair damaged tissues. For example, elevated carbon monoxide levels impede tissue oxygen delivery. Also, nicotine causes constriction of blood vessels, and it inhibits return of the blood supply after injury. Smoking is also believed to lead to some vitamin deficiencies that may allow tissue damage by free radicals or to impaired collagen synthesis. CONCLUSIONS: The evidence suggests that tobacco may have a primary and independent role in injury causation. The implications of this finding are very provocative. Uncovering the mechanism of this relationship may yield tools for reducing injuries among smokers or for non-smokers exposed to second hand smoke.

11. Amoroso, P.J., Dettori, J.R., Reynolds, K.L., et al. Tobacco Use and Injury Risk Among Military Parachutists. Third International Conference for Injury Prevention and Control, Melbourne, Australia, 1996.

ABSTRACT: PURPOSE: Studies of men and women in the U.S. military have demonstrated that smokers are up to 3 times more likely than nonsmokers to experience overuse injuries. To see if the same was true of traumatic injuries, this relationship was tested for individuals engaged in military parachuting; an activity associated primarily with high-energy trauma, not overuse injuries. METHODS: Three groups of U.S. Army soldiers (N=1,706) volunteered to participate in one of three prospective studies. Two studies involved basic airborne school students; the first in 1991 (n=449) and the second in 1992 (n=848). The students each completed five parachute jumps within a one week period. The third population (n=409) was a group of experienced parachutists from an elite combat-ready airborne unit performing a single jump in 1993. Each volunteer completed a demographic questionnaire (which included tobacco use) prior to the first jump. The outcome of interest was injury visits to the troop medical clinic. Logistic regression was used to analyze associations between injuries and the use of cigarettes, the use of chewing tobacco (smokeless tobacco), age, gender, and physical fitness test scores (maximum number of situps in two

minutes, maximum number of pushups in two minutes, and a two-mile timed run). **RESULTS:** The risk of an injury was lower among students than experienced jumpers (6.8/1000 jumps vs. 130/1000 jumps). Injury risk was significantly higher among older and less physically fit individuals (injury risk increased 4% for each additional year of age and decreased 2% for each additional situp). Smokeless tobacco users had a higher risk of injury, [OR 1.52 (95% CI 0.94-2.47)]. However, this association was observed in only two of the three study populations. There was no significant smoking effect detected [OR 0.49 (95% CI 0.11-2.13)]. **CONCLUSION:** The association between physical fitness, age and injury risk is consistent with previous findings. These results suggest a relationship between the use of smokeless tobacco and injury among military parachutists. Failure to identify a smoking effect in this population may indicate that the influence of smoking is more important for injuries caused by repetitive energy transfer rather than the single, high-energy impacts common in military parachuting.

CONFERENCE SUMMARY: Studies of male and female US military populations have demonstrated that smokers are up to 3 times more likely than non-smokers to experience overuse injuries during rigorous physical training. Smokers also appear to be at greater risk for "overuse" injuries and certain traumatic injuries including stress fractures and injuries resulting from motor vehicle crashes. These associations have generally been documented while controlling for the potentially confounding effects of age, race, gender, physical fitness and, in some instances, alcohol use. The causal pathway of this association has not been determined. Leading hypotheses attribute this increase in risk of injury to: risk-taking behaviors, particularly use of drugs or alcohol; lower physical fitness among smokers; carbon monoxide exposure; and nicotine exposure (or withdrawal). It is unclear whether smokers are exposed to greater hazards or are more susceptible to injury due to tissue level effects of tobacco by-products, or both (See Figure 1). Most military studies of the smoking injury relationship have focused on injuries resulting from repetitive trauma, such as that experienced during basic training. Parachute injuries are unique in that they are generally associated with a single, high-energy collision. In addition, military parachutists are distinguished from other military populations in terms of the circumstances surrounding their exposure to risk. Each jump provides a natural experiment in which all participants are exposed to nearly identical conditions. The entire jump sequence usually lasts little more than one minute. Parachuting is further distinguished by the restrictions placed on access to tobacco products. Jumpers must often endure pre-jump waiting periods of one to six hours, during which time they cannot smoke. Since many of these individuals chew tobacco (which is not restricted during this waiting time) this presented a unique study opportunity.

METHODS: Three groups of military parachutists were prospectively studied. The first was a group of 449 Airborne School students, from a single class, in 1991. The second was a group of 848 students from four successive classes, in 1992. The third group was comprised of 409 experienced Airborne soldiers from an elite Airborne unit. Volunteers were sought from each population. After obtaining informed consent, a questionnaire was administered prior to, and following the jumps. The questionnaire included items pertaining to individual smoking behaviors and use of smokeless tobacco, as well as demographic information. A second questionnaire, administered after the parachute jumps were completed, queried respondents about jump conditions and hazards and about any injuries experienced related to the jump. Unit recorded physical fitness test records were also obtained, including time scored on a 2-mile run; maximal number of push ups and sit ups accomplished in a two-minute timed interval; as well as height and weight. Medical records were audited to identify injuries treated in the troop medical clinics. Only injuries resulting in a visit to the clinic or hospital were included as outcome measures. Several different aspects of tobacco's potential influence were independently evaluated: (1) the influence of immediate exposure to smokeless tobacco; (2) the mediation of short-term withdrawal from smoking among current smokers who also chew; and (3) the pure influence of smoking on individuals who do not chew. Nonsmoker, non-users of smokeless tobacco serve as the reference group for these comparisons. Logistic regression analysis was used to identify associations between medically attended injuries and smoking status (current, former <6 months, former >6 months), chewing tobacco use, age, race, gender, pushups, sit-ups, two mile run time, and injury "type" (time-loss from work, soft tissue; bone injury).

RESULTS: The risk of injury for students was approximately 7% versus approximately 13% for

experienced jumpers. Other factors associated with injury, overall, included age and performance on the sit-up portion of the physical fitness test. For each additional year of age, risk of injury increased by 4%. For each additional sit-up performed the risk of injury decreased by 2%. Smokeless tobacco users experienced 50% greater odds of injury than those who did not chew tobacco (though the association was not statistically significant at the .05 level). Smoking did not appear to be related to risk of injury in this population.

<u>Risk Factors</u>	<u>Parameter Estimates</u>	<u>Odds Ratios</u>	<u>95% C I</u>
Benning 1991	-1.8314	0.16	0.08 - 0.32
Benning 1992	-1.3938	0.248	0.15 - 0.91
Smokers	0.0525	1.054	0.50 - 2.22
Former Smokers	-0.2566	0.774	0.39 - 1.52
Chewers	0.4244	1.529	0.95 - 2.47
Sit-ups	-0.0198	0.98	0.96 - 0.99
Age	0.3650	1.037	1.00 - 1.08

DISCUSSION: A number of studies have documented associations between age, fitness, and injury risk in military training populations. Previous studies have also identified a relationship between smoking and various injuries--including overuse injuries; fractures and stress fractures; intentional injuries (suicide, violence); motor vehicle injuries; back pain and carpal tunnel syndrome. Failure to document an association between *smoking* and injury in this study, may provide a clue about how tobacco and injuries are related. Because access to smoking is severely restricted prior to parachute jumping this might indicate that elevated injury risks are due to the acute effects of recent nicotine exposure. Some researchers have demonstrated cognitive deficits among those with elevated levels of nicotine. An alternative explanation concerns the types of injuries related to tobacco use. Parachute injuries are unique in that they involve a one-time, high-impact, exposure. Perhaps smoking presents greater problems for individuals experiencing repetitive trauma. The association between chewing tobacco and injury is less well understood. The results from this analysis suggest there may be a relationship between acute exposure, since the parachutists could chew tobacco without restriction, and injury. Alternatively, those with more sensitivity to withdrawal from smoking (more addicted), may have opted to chew tobacco since smoking was restricted. The high injury rates among those who chewed tobacco could be a reflection of this migration of higher risk smokers to the pool of tobacco chewers. More precise measures of tobacco exposure will be required before these relationships can be adequately classified.

CONCLUSIONS: 1. This study confirms the relationship between physical fitness, age, and risk of injury. 2. Further research is needed to clarify the associations between smoking, chewing tobacco, and injuries. 3. Injury researchers should include tobacco use in their analyses in order to better understand these relationships and to control for the potential confounding effects of tobacco use. (PJA)

12. Anderson, J.J. and Felson, D.T. Factors associated with osteoarthritis of the knee in the First National Health and Nutrition Examination Survey (HANES I). Am J Epidemiol 128(1):179-189, 1988.

ABSTRACT: The authors used data from the United States first national health and Nutrition Examination Survey of 1971-1975 (HANES I) to explored the cross-sectional associations between radiographic osteoarthritis of the knee and a variety of putative risk factors. A total of 5,193 black and white study participants aged 35-74 years, 315 whom had x-ray diagnose osteoarthritis of the knee, were available for analysis. after controlling for confounders, the authors found significant associations of knee osteoarthritis with overweight, race, and occupation, all of which have been suggested by smaller cross-sectional studies. They then focused specifically on those factors. For overweight, they found a strong association between current obesity and osteoarthritis of the knee, with a dose-response effect not previously assessed. This association was also seen for self-reported minimum adult weight, a proxy for long-term obesity, and was present in persons with asymptomatic osteoarthritis of the knee. These

findings strongly suggest that obesity is causative. HANES I was the first study in which racial differences in osteoarthritis of the knee could be assessed within the same country. The black women who were studied had an increased risk of disease (odds ratio (OR)=2.12, 95% confidence interval (CI)=1.39, 3.23) after controlling for age and weight, although the black men did not. Finally, the authors used the US Department of Labor Dictionary of Occupational Titles to obtain characterizations of the physical demands and knee-bending stress associated with occupations and study the reaction between physical demands of jobs and osteoarthritis of the knee. They found for persons aged 55-64 years an association between knee-bending demands and osteoarthritis of the knee (men, OR=2.45, 95% CI = 1.21-4.97; women OR=1.22-10.52). Since such occupational physical demands are common, the authors conclude that they may be associated with a substantial proportion of osteoarthritis of the knee.

13. Andersson, K., Jansson, A., Kuylenstierna, F. and Eneroth, P. Nicotine and its major metabolite cotinine have different effects on aldosterone and prolactin serum levels in the normal male rat. Eur J Pharmacol 228(5):305-12, 1993.

ABSTRACT: Nicotine (0.01-1.0 mg/kg, i.p.) or cotinine (0.003-1.0 mg/kg, i.p.) treatment was administered to Sprague-Dawley male rats. The time-effect curves (5, 10, 30, 60 and 180 min) were analyzed. Nicotine dose-dependently increased blood aldosterone and corticosterone levels with a peak effect 10 min after the intraperitoneal injection. Nicotine treatment weakly decreased serum levels of aldosterone at 2 h, possibly as a consequence of nicotine metabolizing to cotinine, resulting in higher serum levels of cotinine than nicotine. Cotinine dose-dependently reduced serum aldosterone levels, an effect which became more marked with time, leaving plasma corticosterone unchanged. Nicotine dose-dependently increased serum prolactin levels at 5 and 10 min following treatment, an effect which had diminished at 30 min. Cotinine dose-dependently reduced serum prolactin levels at 5 min followed by a dose-dependent increase at 10 min after which a dose-dependent reduction was again found after 30 min post treatment. In conclusion, acute nicotine and cotinine treatment produced opposite effects on aldosterone and prolactin serum levels. The prolonged effect of cotinine on aldosterone levels may be involved in changes in brain function, and may be connected to the development of withdrawal effects after stopping cigarette smoking. As reported by other investigators, nicotine produced enhanced plasma corticosterone levels while cotinine treatment was ineffective. Since cotinine induced marked changes in serum prolactin levels while leaving LH levels unchanged, it seems plausible that cotinine affects neuroendocrine regulation via mechanisms not primarily related to circulatory effects. Thus, an action at the median eminencepituitary level seems likely.

14. Andreski, P. and Breslau, N. Smoking and nicotine dependence in young adults: differences between blacks and whites. Drug Alcohol Depend 32(2):119-25, 1993.

ABSTRACT: Analysis of data from a household interview of young adults in Michigan was conducted to determine the prevalence of smoking and nicotine dependence and to examine the relationship of nicotine dependence with health indicators in black and white smokers. The NIMH Diagnostic Interview Schedule, revised to cover DSM-III-R diagnoses, was used to assess nicotine dependence. A greater proportion of whites than blacks tried smoking, became regular smokers and met criteria for nicotine dependence. Whites had their first cigarette, began smoking regularly and manifested symptoms of nicotine dependence at a younger age than blacks. Nicotine dependence, rather than smoking per se, was associated with poor physical and psychological health among both blacks and whites. However, it had stronger associations with health problems in blacks than in whites.

15. Anon. Editorial: Tobacco amblyopia. Canadian Medical Association Journal 102(February):420, 1996.

16. Anon. Smoking considered as an addiction. Med J Aust Special Supplement 26

July:4, 1975.

17. Anon. List of illnesses and disabilities associated with smoking. Med J Aust Special Supplement, 1975.

18. Anon. Reasons for tobacco use and symptoms of nicotine withdrawal among adolescent and young adult tobacco users -- United States, 1993. MMWR 43(41):745-50, 1994.

ABSTRACT: Cigarettes and other forms of tobacco are addictive because of the presence of nicotine(1). Among adults in the United States who have ever smoked daily, 91.3% tried their first cigarette and 77.0% became daily smokers before age 20 years (2). Among high school seniors who had ever tried smokeless tobacco (SLT), 73% did so by the ninth grade (2). To further characterize the development of nicotine addiction among persons aged 10-22 years, CDC analyzed data from the 1993 Teenage Attitudes and Practices Survey (TAPS-II). This report summarizes the results of that analysis and focuses on assessments of reasons for using tobacco and symptoms of nicotine withdrawal.

COMMENTS: *This study found that among adolescents, smoking to relax and difficulty quitting was reported for all smokers. However, the percentage who reported these reasons increased with increasing lifetime use, as well as increased frequency and intensity of use. (JAB)*

19. Anon. Surveillance for selected tobacco-use behaviors -- United States, 1900-1994. MMWR 43(SS-3):1-43, 1994.

COMMENTS: *Prevalence rates of smoking stratified by age, sex, and race from 1900-1994. (JAB)*

20. Anon. Indicators of nicotine addiction among women -- United States, 1991-1992. MMWR 44(6):102-5, 1995.

ABSTRACT: An estimated 22 million U.S. women were current smokers in 1993; of these, 73% wanted to quit smoking (1). However, attempts to quit smoking and to remain abstinent are hindered by nicotine addiction and by the subsequent effects of nicotine withdrawal (2). To assess the prevalence of selected indicators of nicotine addiction among U.S. women, CDC analyzed data from the National Household Survey on Drug Abuse (NHSDA) in 1991 and 1992 (3). This report presents the findings of the analysis.(ABSTRACT TRUNCATED AT 250 WORDS)

21. Apseloff, G., Ashton, H.M., Friedman, H. and Gerber, N. The importance of measuring cotinine levels to identify smokers in clinical trials [see comments]. Clin Pharmacol Ther 56(4):460-2, 1994.

ABSTRACT: First-time-in-humans studies of drugs (phase I) typically exclude unsuitable volunteers by testing for recreational drugs. However, volunteers are usually not screened for cotinine, a metabolite of nicotine, even though tobacco products may alter pharmacokinetic and pharmacodynamic parameters and withdrawal from tobacco may cause additional adverse events. The accuracy of personal histories as a means of excluding smokers was examined prospectively in three phase I units in the northeastern, midwestern, and southwestern United States. In studies intended for non-smokers, 45 of 282 purported non-smokers screened before enrollment tested positive for cotinine. This suggests that personal histories are unreliable in determining tobacco use in clinical trials designated for non-smokers.

22. Arakaki, A. and Tsai, T.M. Thumb replantation: survival factors and re-exploration in 122 cases. J Hand Surg [Br] 18(2):152-6, 1993.

ABSTRACT: We analyzed 122 cases of replantation following complete amputation of the thumb and correlated various factors with rates of survival. The overall survival rate of thumb replantation was 71%. The type of amputation markedly affected survival rate. In minimally damaged amputations, the time period from injury to the start of surgery was the only significant factor related to survival. Other factors such as age, smoking history, amputation level, the number of vessels reconstructed and the method used did not relate statistically to survival. With avulsion amputations, the survival rate of replantation at and proximal to the MP joint was significantly better than replantation distal to the MP joint. 20 thumbs required re-exploration for vascular compromise; nine of these were salvaged (45%).

23. Armstrong, T.J., Foulke, J.A., Joseph, B.S. and Goldstein, S.A. Investigation of cumulative trauma disorders in a poultry processing plant. Am Ind Hyg Assoc J 43(2):103-16, 1982.

ABSTRACT: Cumulative trauma disorders such as carpal tunnel syndrome and tenosynovitis can be caused, precipitated, or aggravated by repeated exertions with the hand. This paper describes a study in a poultry processing factory that proceeds from an analysis of health records to an analysis of work methods, postures and forces. Alternative work procedures and knife designs are recommended to reduce stressful work postures and forces.

24. Ashton, H., Savage, R.D., Telford, R., Thompson, J.W. and Watson, D.W. The effects of cigarette smoking on the response to stress in a driving simulator. Br J Pharmacol 45(3):546-56, 1972.

ABSTRACT: 1. Some behavioral and physiological responses of cigarette smokers and non-smokers exposed to varying degrees of stress in a driving simulator were compared. 2. When the smokers were smoking a cigarette, some of their reaction times to light signals differed significantly from those of non-smokers, some being longer and some shorter. These differences disappeared when the smokers were not smoking. 3. Of the physiological measurements, only heart rate differed significantly between smokers and non-smokers, being higher at all levels of stress in the smokers. There were no significant differences in blood pressure, calf blood flow and respiration rate between smokers and non-smokers. 4. The results of the Cattell Sixteen Personality Factor Questionnaire showed that smokers were significantly more extroverted and self reliant than the non-smokers. 5. The results are discussed in relation to the pharmacology of cigarette smoking. It is concluded that the differences in reaction times and heart rates between smokers and non smokers were a consequence of cigarette smoking. (PJA)

COMMENTS: *This study placed perhaps too much importance on the act of smoking and not enough on the physiological differences of the possible smoking states -- smoker, deprived smoker, and non-smoker. (PJA)*

25. Awan, K.J. Smoking and eye injuries to toddlers [letter]. JAMA 251(23):3080, 1984.

COMMENTS: *The author outlines 14 cases of toddlers seen in his practice for burn injuries caused by cigarettes. (PJA)*

26. Baden, L., Weiss, S.T., Thomas, H.E., Jr. and Sparrow, D. Smoking status and the electrocardiogram: a cross-sectional and longitudinal study. Arch Environ Health

37(6):365-9, 1982.

ABSTRACT: Previous cross-sectional studies have shown age trends in electrocardiographic wave patterns, including leftward shift in frontal plane axis and decreases in R, S, and T wave amplitudes with age. The effects of smoking on electrocardiographic measurements have also been examined. Findings of several studies vary and include possible smoking-induced changes in T wave amplitude and frontal plane axis measurements. To examine both cross-sectionally and longitudinally the effects of cigarette smoking on electrocardiographic measurements, serial recordings obtained 5 yr apart were taken from 702 healthy male participants of the Normative Aging Study, who were 23-74 yr of age at their first examination. These men were classified as current smokers (at both baseline and follow-up examinations, N = 291), former smokers (men who stopped smoking prior to the baseline examination, N = 203), or never smokers (at any time, N = 208). At baseline, P-R interval duration was shorter in current smokers than in former or never smokers. Longitudinal results indicated that R, S, and T wave amplitudes decreased at greater rates in smokers than in non-smokers. These findings suggest that changes in the electrocardiogram attributed to aging may be modified by smoking.

27. Bahrke, M., Baur, T., Poland, D.F. and Conners, D.F. Tobacco use and performance on the U.S. Army Physical Fitness Test. Mil Med 153(5):229-235, 1988.

ABSTRACT: The relationship of cigarette smoking, smokeless tobacco use, and level of motivation to performance on the U.S. Army Physical Fitness Test (APFT) was examined in a series of three studies. In the first study military personnel (N=147) attending a four-week physical training course were evaluated on measures of fitness including body weight, percentage of body fat, muscular endurance (maximum number of push-ups and sit-ups performed within two minutes) and cardiorespiratory endurance (time required to run two miles). Subjects also completed a smoking habits questionnaire. Soldiers who smoked weighed significantly less, had a significantly lower percentage of body fat, and possessed significantly lower levels of muscular endurance. In addition, as the number of cigarettes smoked per day increased, body weight and repetitions of push-ups and sit-ups decreased significantly. While these results are suggestive of a relationship between smoking and levels of fitness, a more plausible explanation is that the differences more accurately reflect different lifestyles including levels of motivation, exercise, and dietary habits. To test the hypothesis that level of motivation may be a mediating factor between cigarette smoking and physical performance, a second investigation was undertaken to assess the fitness and motivational characteristics of 130 soldiers. Measures of fitness again included body weight, percentage of body fat., muscular endurance, and cardiorespiratory endurance. Motivation was measured with the Self-Motivation Inventory. Subjects completed a smoking habits questionnaire and were classified as smokers (n=48) and non-smokers (n=82). Analysis of variance revealed that soldiers who smoked weighed significantly less, performed fewer push-ups and sit-ups, ran slower, and were less motivated. Discriminant function analysis indicated push-ups, 2-mile run, sit-ups, motivation, body weight, age, body fat, and height to be the descending order of magnitude in differentiating between smokers and non-smokers. These results are suggestive of a relationship between smoking, motivation, and performance on the APFT. Finally, while the health hazards of smokeless tobacco (ST) are apparent, there is little information available to document the relationship between habitual use and physical performance. The purpose of the third study was to examine the relationship between habitual use and physical performance. The purpose of the third study was to examine the relationship between regular use of ST and performance on the APFT. One hundred and twelve soldiers, 58 ST users and 54 non-tobacco users, were compared on the same measures of muscular and cardiorespiratory endurance. There were no significant differences in performance between users and non-users. However, among users, significant correlations were obtained between the number of years using ST and age, push-ups, sit-ups, and the two-mile run. The longer ST was used, the poorer the performance. These data suggest that chronic use of ST may be detrimental to performance on the APFT.

28. Balfour, D.J. Neural mechanisms underlying nicotine dependence. Addiction 89(11):1419-23, 1994.

ABSTRACT: There is little doubt that many habitual smokers find it difficult to quit the habit because they have become addicted to the nicotine present in the smoke. This paper addresses some of the pharmacological mechanisms underlying this addiction and discusses how an understanding of these mechanisms may contribute to the more effective use of nicotine replacement therapy during smoking cessation. It considers critically the evidence that the rewarding properties of nicotine, which serve to reinforce drug-seeking behavior, are related to stimulation of the mesolimbic dopamine system of the brain. The critique focuses specifically on the evidence that many central nicotinic receptors, including those which mediate the effects of the drug on dopamine secretion, are readily desensitized by chronic exposure to agonist and that hypotheses which assume that nicotine inhaled from tobacco smoke invariably results in stimulation of the receptors must be treated with caution. Nicotinic receptors in the brain are, however, heterogeneous in nature with different molecular structures and pharmacologies. It is concluded that the reinforcing properties of nicotine sought by smokers may reflect both stimulation and desensitization of the different nicotinic receptor populations, and that smokers may adjust their smoking habits to achieve the balance of receptor stimulation and desensitization which they find most reinforcing. It seems likely that the efficacy of the different nicotine formulations during the treatment of smoking cessation may also reflect their ability to stimulate or desensitize brain nicotinic receptors.

29. Ballard, J.E., Koepsell, T.D. and Rivara, F. Association of smoking and alcohol drinking with residential fire injuries. Am J Epidemiol 135(1):26-34, 1992.

ABSTRACT: To investigate whether tobacco, alcohol, and their combined use are important risk factors for fire injuries, the authors analyzed data from a population-based case-control study in King County, Washington, between 1986 and 1987. Cases (n = 116) were households with at least one fatal or nonfatal unintentional residential fire injury reported to the Washington State Fire Incident Reporting System from 1984 through 1985. Controls were selected by random digit dialing (n = 256). After adjustment for household size, number of male household members, total household income, and education of the head of the household, the odds ratio for fire injury in households whose members collectively smoked 1-9 cigarettes per day was 1.5 (95% confidence interval (CI) 0.6-4.2) relative to households with no smokers; for 10-19 cigarettes per day, the odds ratio was 6.6 (95% CI 2.5-17.5), and for 20 or more cigarettes per day, it was 3.6 (95% CI 1.9-7.2). Although households with alcohol drinkers who consumed five or more drinks per occasion were found to be at increased risk in the crude analysis, multivariate analysis suggested that this was partly because drinkers tended to live in households with higher smoking levels. Thus, even though households with alcohol drinkers who consume five or more drinks per occasion may be at increased risk of residential fire injury, smoking appears to be the more important underlying risk factor.

30. Balldin, B. Accidental poisoning of children. Tobacco and drugs are the most common factors. Lakartindningen 66(21):2230-2234, 1969.

31. Barrett-Connor, E. and Khaw, K.T. Cigarette smoking and increased endogenous estrogen levels in men. Am J Epidemiol 126(2):187-92, 1987.

ABSTRACT: In a population-based study of 590 Rancho Bernardo, California men aged 30-79 years without a history of cardiovascular disease, and who were first surveyed in 1972-1974, current cigarette smokers had significantly higher mean endogenous androstenedione, estrogen, and estradiol levels compared to non-smokers. In the cigarette smokers, a dose-response relationship was apparent for these hormones with mean levels increasing with increasing reported cigarette consumption. These differences persisted after adjusting for age and body mass index, and were not accounted for by either caffeine or

alcohol intake, or exercise habit. In a further 89 men with a history of cardiovascular disease, hormone levels were not significantly related to smoking habit. The higher endogenous estrogen levels in cigarette smokers may confound the interpretation of studies reporting higher estrogen levels in male myocardial infarction survivors compared to controls.

32. Battie, M.C., Bigos, S.J., Fisher, L.D., et al. A prospective study of the role of cardiovascular risk factors and fitness in industrial back pain complaints. Spine 14(2):141-7, 1989.

ABSTRACT: The authors conducted a prospective study of risk factors for industrial back pain complaints among 3,020 aircraft manufacturing employees. The study subjects completed a cardiovascular risk questionnaire, and were asked about their smoking status and past medical history, including previous back problems. Premorbid submaximal treadmill testing to predict maximum oxygen uptake ($VO_{2\text{max}}$) was completed in 2,434 subjects who were not excluded from testing due to cardiovascular risk screening. During several years of subsequent follow-up, 279 subjects reported back problems. Those who reported smoking at the time of the premorbid examination were significantly more likely to report a subsequent back problem than non-smokers ($P = 0.002$). When controlling for sex and age, cardiovascular fitness, as measured through $VO_{2\text{ max}}$, was not predictive of future back injury reports ($P = 0.26$).

COMMENTS: *Smoking is a risk factor for low back pain. In this study, when 3000, 21- to 67-year-old industrial workers were studied, smokers had a 40% higher incidence of back pain during a 4 year follow up period. (PJA)*

33. Battie, M.C., Videman, T., Gill, K., et al. 1991 Volvo Award in clinical sciences. Smoking and lumbar intervertebral disc degeneration: an MRI study of identical twins. Spine 16(9):1015-21, 1991.

ABSTRACT: The primary objective of this study was to determine whether disc degeneration, as assessed through magnetic resonance imaging, is greater in smokers than in non-smokers. To control for the maximum number of potentially confounding variables, pairs of identical twins highly discordant for cigarette smoking were selected as study subjects. Data analyses revealed 18% greater mean disc degeneration scores in the lumbar spines of smokers as compared with non-smokers. The effect was present across the entire lumbar spine, implicating a mechanism acting systematically. This investigation demonstrates the efficiency of using carefully selected controls in studying conditions of multifactorial etiology, such as disc degeneration.

COMMENT: *Twenty identical male twin pairs discordant for smoking status were studied to assess the relationship between smoking and intervertebral disc degeneration. Results showed that smokers had greater disc degeneration. Prior to this study these twin pairs had undergone sonography of the carotid arteries to assess carotid arteriosclerosis, which is thought to be indicative of the circulatory system in general. Smokers were found to have larger arteriosclerotic plaques. These findings suggest that smoking by increasing arteriosclerosis may indirectly increase disc degeneration. This is supportive evidence that disc degeneration is caused by decreased blood flow to the disc and surrounding tissues. (JAB)*

34. Battistel, M., Plebani, M., Di Mario, F., et al. Chronic nicotine intake causes vascular dysregulation in the rat gastric mucosa. Gut 34(12):1688-92, 1993.

ABSTRACT: Chronic cigarette smoking has adverse effects on peptic ulcer disease because the healing of ulcers is delayed and the incidence of relapses is enhanced. Short term intake of nicotine induces vascular damage in the rat gastric mucosa, but the pathophysiological mechanisms of nicotine's action in

the stomach are largely unknown. In this study rats were treated with nicotine, added to their drinking water, for 50 days. They were then anesthetized and their stomachs perfused with acidified acetylsalicylic acid (ASA). Chronic nicotine treatment failed to change the effects of acidified ASA to induce gastric mucosal acid back diffusion, hemorrhagic damage and bleeding. Basal blood flow in the gastric mucosa was also unchanged by chronic nicotine intake, whereas the mucosal hyperemia evoked by ASA induced acid back diffusion was averted. The concentrations of sulfidoleukotrienes were significantly augmented in the gastric wall of nicotine treated rats. These data show that chronic nicotine intake causes dysregulation of the gastric microcirculation, an effect that is associated with biochemical changes in the stomach. This study thus substantiates the adverse effects of smoking on gastric mucosal pathophysiology. These data suggest that inappropriate regulation of gastric mucosal blood flow inhibits recovery from gastric mucosal injury in smokers.

35. Bauman, K.E and Ennett, S.E. Tobacco use by black and white adolescents: The validity of self-reports. Am J Public Health 84(3):394-398, 1994.

ABSTRACT: Objectives: Previous studies concluded that Black adolescents use tobacco and other drugs less than White adolescents. The Black-White differences typically were attributed to variations in background and life-style. The objective of the research reported in this paper was to determine whether the presumed difference in tobacco use is due to Black-White differences in the validity of self-reports. Methods: We used biochemical measures to compare the validity of self-reports of tobacco use by 1823 Black and White adolescents and to assess the contribution of variation in validity to Black-White differences in reported tobacco use. Results: The sensitivity of Blacks' reports was significantly less than the sensitivity of whites' reports. The specificity of Whites' reports was significantly less than the specificity of Blacks' reports. Much of the Black-White differences in reports of cigarette smoking and tobacco use were due to Black-White differences in validity. Conclusions: Studies of Black-White differences should adjust for the invalidity of reports or acknowledge that much of the difference may be due measurement error. (Am J Public Health, 1994;84:394;398)

COMMENTS: *The validity of self-reported tobacco use may be different among different racial groups. There may also be differences among other demographic categories. This has implications for research on smoking and injury when self reports are used. (JAB)*

36. Benazzi, F. and Mazzoli, M. Psychotic affective disorder after nicotine withdrawal [letter]. Am J Psychiatry 151(3):452, 1994.

37. Benowitz, N., Jacob, P. and Kozlowski, L. Influence of smoking fewer cigarettes on exposure to tar, nicotine, and carbon monoxide. N Eng J Med 315:1310-1313, 1986.

ABSTRACT: In the hope of reducing the adverse health consequences of smoking, physicians frequently advise their patients who cannot quit to smoke fewer cigarettes. Habitual smokers may compensate for the reduced number of cigarettes, however, by taking in more smoke per cigarette. We measured the intake of tar (estimated as mutagenic activity of the urine), nicotine, and carbon monoxide during short-term cigarette restriction. With a reduction from an average of 37 cigarettes to average of 5 cigarettes per day, the intake of tobacco toxins per cigarette increased roughly threefold and daily exposure to tar and carbon monoxide declined only 50 percent. We conclude that smoking fewer cigarettes may reduce exposure to toxins and related health consequences. However, consistent with a tendency to maintain intake of nicotine, the magnitude of the benefit is much less than expected. Whether "oversmoking" persists during long-term restriction of cigarettes requires further investigation.

38. Benowitz, N.L. Clinical pharmacology of nicotine. Annu Rev Med 37: 21-32, 1986.

ABSTRACT: Nicotine is the primary reason why people consume tobacco products and it may contribute to causation of tobacco-related diseases. This chapter reviews the human pharmacology of nicotine, the evidence for a role of nicotine in human disease, and the use of nicotine (gum) as a therapeutic agent in smoking cessation therapy.

39. Benowitz, N.L. Cigarette smoking and nicotine addiction. Med Clin North Am 76(2):415-37, 1992.

ABSTRACT: Smokers smoke in large part because of the addictive effects of nicotine. Nicotine affects mood and performance and has been clearly implicated as the source of addiction to tobacco. People smoke to deliver desired doses of nicotine to their bodies, with certain rates of delivery and intervals between doses; these behaviors tend to be consistent for a person from day to day. Rational treatment of the pharmacologic aspects of tobacco addiction includes nicotine substitution therapy. New formulations of nicotine substitutes will provide more options to the physician for tailoring treatment to the needs of individual smokers. Other pharmacotherapies, particularly antidepressant drugs, hold promise for certain smokers.

40. Berfenstam, R., Lagerberg, D. and Smedby, B. Victim characteristics in fatal home accidents. Alcohol, mental disorder, and suicidal intent in officially registered accidents in the home. Acta Sociomed Scand 1(3):145-64, 1969.

41. Biener, K., Forest, F. and Schar, M. [Normogram study: representative data on the state of health of male industrial workers in northern Switzerland. Report: anamnesis and health behavior]. Schweiz Med Wochenschr 106(38):1279-84, 1976.

ABSTRACT: To obtain representative data about the health of industrial workers in northern Switzerland, 1260 men from 44 plants have been examined. At the time of our study, 21% were under treatment by a doctor and 52% had so been 1-3 times during the previous year. 44% had at some time in the past been patients in a surgical department, 13% in a department for internal medicine and 29% in a department for special diseases. During the previous year 39% reported loss of working days through illness. In 13%, working days had been lost through accidents. 48% were smokers, 38% had never smoked, and 14% had stopped smoking. Alcohol was consumed daily by 37%, three times a week by 30% and once a week by 18%; 11% drank rarely and 4% never, 16% took medicines often, 40% rarely and 44% never. The results of the study are classified by 5-year-age groups and compared.

42. Biering-Sørensen, F. and Thomsen, C. Medical, social, and occupational history as risk indicators for low-back trouble in a general population. Spine 11(7):720-725, 1986.

ABSTRACT: Sixty-eight medical, social, and occupational history variables were analyzed in a general population of 442 men and 478 women, aged 30, 40, 50, and 60 years to identify possible indicators for first-time experience and recurrence of persistence of low-back trouble (LBT) during a 1-year follow-up. Variables that in univariate analyses showed statistically significant indications for future LBT were subjected to stepwise logistic regression analyses. The most important indicators for recurrence or persistence of LBT thus identified were, for men, intermittent claudication, restlessness, or other discomfort in the lower limbs, frequent headache, and living alone. For women, the corresponding indicators were rumbling of "the stomach" and feeling of fatigue. For first-time experience of LBT, the indicators identified by the regression analyses were frequent pain in the top of the stomach, previous hospitalizations and operations, daily smoking, and a long distance from home to work. The result

suggests that the population likely to experience future LBT does not enjoy good general health even prior to its first LBT episode, and this, in turn, may be due to greater psychosocial pressure.

COMMENTS: *Smoking was independently related to low back trouble (LBT). The authors mention several possible mechanisms to explain this relationship. In addition, people suffering from LBT generally have more health problems. It may be that smokers also have more health problems or that people who have health problems tend to be smokers. It was also found that people who live alone were at higher risk for LBT, and the authors suggest that these people may, in turn, be exposed to higher social and psychological pressure. This may have some connection to smoking and people who smoke in response to stress and their risk for injury. (JAB)*

43. Blache, D., Bouthillier, D. and Davignon, J. Acute influence of smoking on platelet behavior, endothelium and plasma lipids and normalization by aspirin [see comments]. *Atherosclerosis* 93(3):179-88, 1992.

ABSTRACT: This study was conducted to investigate acute effects of smoking on platelet function, endothelial cells and plasma lipids and to follow these parameters after Aspirin ingestion. Twelve fasting smokers each inhaled the smoke of one cigarette. Blood was drawn before and 10 min after smoking. Plasma nicotine, measured by gas chromatography, increased from 13.48 before smoking to 78.41 nM after smoking. Platelet aggregation to thrombin and ADP increased significantly (P less than 0.001). The platelet aggregate ratio decreased from 0.95 to 0.75 (P less than 0.005). Plasma beta-thromboglobulin also increased in post-smoking samples as measured using radioimmunoassay. 'Circulating endothelial cells' increased significantly after smoking (P less than 0.005). Triglycerides decreased (P less than 0.005) in plasma and in the VLDL fraction (P less than 0.05). Both post-smoking plasma free fatty acids and free glycerol increased, respectively, as compared with respective values. Lipase activity ascribable to lipoprotein lipase and hepatic lipase, absent in pre-smoking plasma samples, could be detected in post-smoking plasma without heparin injection. At least 1 week later, the subjects returned to follow an identical protocol except that they had ingested Aspirin (650 mg) 10-14 h before blood sampling. The same parameters were measured before and after smoking the same cigarette. Except for plasma nicotine, all the smoking-induced changes were abolished by ingestion of Aspirin. The results of this study indicate an interrelationship between platelet hyperactivity, endothelial injury and plasma lipids. They also demonstrate an inhibition of the major smoking-induced changes by Aspirin in the presence of high plasma nicotine levels. It is concluded that Aspirin may offset several of the deleterious acute effects of smoking. However, our conclusions cannot be, in any way, extended for long-term effects of both smoking and Aspirin treatment. Based on these data, it is suggested that there may be some links between platelet hyperactivity, endothelium injury and plasma lipids.

44. Blackmore, D.J. Interpretation of carboxyhemoglobin found at post mortem in victims of aircraft accidents. *Aerospace Med* 41(7):757-9, 1970.

ABSTRACT: The problems of the interpretation of carboxyhemoglobin saturation as determined on blood taken at post mortem are discussed with relation to errors in methodology; the normal range; endogenous production of carbon monoxide; range of carboxyhemoglobin saturation following inhalation of the products of combustion and the differentiation of the products of combustion and the differentiation between carboxyhemoglobin subsequent to inhalation of fire and tobacco smoking. Measurement of the carbon monoxide content of a specimen by gas chromatography and comparison with the total hemoglobin content as determined by atomic absorption spectrophotometry and spectrophotometry is the method of choice. Using this technique a carboxyhemoglobin saturation in excess of 8% is outside the range observed in accident victims not associated with fire. Anomalies can occur in which low carboxyhemoglobin saturations are observed following inhalation of fire as deduced from pathological and anatomical findings. Carbon monoxide is produced sporadically in stored blood

specimens, although at 40 C none was produced in 21 days following deliberate contamination of samples. Staining erythrocytes for the presence of carboxyhemoglobin as proved a useful adjunct in the assessment of time between inhalation of carbon monoxide and death.

45. Blann, A.D. and McCollum, C.N. von Willebrand factor, endothelial cell damage and atherosclerosis. Eur J Vasc Surg 8(1):10-5, 1994.

ABSTRACT: von Willebrand factor (vWF) is an interesting and potentially important molecule whose biology in health and disease warrants attention. A growing body of knowledge now suggests that plasma levels of this specific product of the endothelial cell may have potential as a marker for the assessment of endothelial injury *in vivo*. As its functions include platelet aggregation and mediation of platelet adhesion to the subendothelium, it may also have a role in the pathogenesis of progression of atherosclerosis. In comparison to asymptomatic controls, increased levels of vWF are found in atherosclerotic vascular disease and in the presence of several of its major risk factors (smoking, hypercholesterolaemia, hypertension, obesity and diabetes). High plasma levels of vWF are also associated with the prediction of adverse clinical events such as myocardial infarction and poor outcome following arterial surgery, possibly by the promotion of thrombus formation. These and other studies indicate that research directed towards determining whether therapy to reduce levels of vWF also influences the progression of arterial disease should prove to be profitable.

46. Bolin, A., Eklund, G., Frithiof, L. and Lavstedt, S. The effect of changed smoking habits on marginal alveolar bone loss: A longitudinal study. Swed Dent J 17(5):211-6, 1993.

ABSTRACT: Tobacco smoking is a factor claimed to be of influence on alveolar bone loss. The purpose of the present study was to investigate whether the effect of changed smoking habits is associated with the progress of proximal marginal alveolar bone loss as measured on intraoral radiographs. The study comprised 349 individuals with twenty or more remaining teeth examined in 1970 and 1980. The bone loss in the period was measured as the difference in the ratios bone height/root length at proximal tooth sides between the two examinations. It was found that the marginal bone loss in Non smokers in 1970 and 1980 was as a mean 3.9 per cent of the root length. The corresponding value among Smokers 1970 and 1980 was 6.0 per cent. The difference is statistically significant ($p = 0.001$). In individuals who had given up smoking during the 10-year period (bone loss: 4.4 per cent) as compared with those who had smoked regularly, the progression of bone loss was significantly ($p < 0.05$) retarded. The result is in agreement with the hypothesis that giving up smoking produces favorable effects also with regard to the attachment of the teeth in the jaw-bone.

47. Bolse, J.O. and Holder, H.D. Injury-related medical care utilization in a problem drinking society. Am J Public Health 81(12):1571-1575, 1991.

ABSTRACT: Background: Population-based data on the overall risk of injury among problem drinkers are extremely limited. Methods: We conducted an eight-year study of injury-related medical care utilization for a group of problem drinkers ($n=3729$) enrolled in the health insurance plan of a large manufacturing firm with plants in a number of midwestern states. A comparison non-problem drinking cohort matched on age, gender, and number of years of enrollment with the same company plan was also utilized. Results: Problem Drinkers utilized injury-related medical care at a rate 1.6 times that of the comparison group and experienced injury-related medical care costs which were three times as high. Increased risks were found for both men and women and for all ages studied. Conclusions: This study is one of the few to examine the overall incidence of fatal and non-fatal injuries among a large population of problem drinkers and provides evidence that higher medical care costs are associated with chronic alcohol use.

48. Bongard, F.S., Ostrow, L.B., Sacks, S.T., McGuire, A. and Trunkey, D.D. Fatal hospital-acquired burns [letter]. JAMA 252(20):2813, 1984.

COMMENTS: *This letter discusses the problem of fatal hospital-based fire deaths. 53% of these were traced to a cigarette ignition source. The five deaths which occurred were all related to cigarette burns.* (PJA)

49. Boshuizen, H.C., Verbeek, J.H., Broersen, J.P. and Weel, A.N. Do smokers get more back pain? Spine 18(1):35-40, 1993.

ABSTRACT: Recently smoking has been increasingly implicated as a possible risk factor for low-back pain. One explanation for this finding is confounding by occupation. To investigate this possibility, the relationship between smoking and self-reported back pain was studied within 13 occupations. A relationship between smoking and back pain was observed only in occupations that require physical exertion. The relationship between smoking and other musculoskeletal pain also was explored. Pain in the extremities turned out to be related more clearly to smoking than to pain in the neck or the back. This suggests confounding or a general influence of smoking on pain. It is concluded that prevention of back pain could be a beneficial side-effect of anti-smoking campaigns. However, the prime target for prevention of low-back pain would have to be other factors.

50. Botkin, J.R. The fire-safe cigarette. JAMA 260(2):226-9, 1988.

ABSTRACT: Fires caused by cigarettes through the ignition of upholstered furniture and mattresses are a serious public health problem, accounting for more than 1500 deaths and 7000 serious injuries per year in the United States. Fire-resistant fabrics and stuffings, public education, and smoke detectors have had a limited impact on this problem. The federal government recently has completed a three-year study of possible modifications in cigarette design. The study has demonstrated the technical feasibility of product design changes that would substantially reduce the propensity of cigarettes to ignite fires. Legislation currently is pending in Congress and in three state legislatures to mandate a cigarette fire safety standard. This legislation deserves strong support by the medical profession.

51. Bourlaud, I., Underner, M., Perault, M.C. and Patte, F. [Pharmacology of nicotine]. Rev Mal Respir 9(4):367-74, 1992.

ABSTRACT: Nicotine has a small molecular weight and is absorbed via the mucosa (Guccal or nasal), the pulmonary alveoli and the skin. The phenomenon of autotitration explains how a dependent smoker can unconsciously change his method of smoking to maintain a steady nicotine level. Nicotine leads to a liberation of catecholamines by acting on the nervous system through the intermediary of nicotine receptors. There is increased vigilance and powers of intellectual concentration, an awakening reaction and some anxiolytic and euphoriant effects. From the cardiac stand point there is an increased heart rate and blood pressure, as a result of the sympathomimetic effects. Elimination is via the kidneys as unchanged nicotine, cotinine and 1'-N-oxide of nicotine. Nicotine has an addictive action and is capable of inducing pharmacological dependency, tolerance and withdrawal syndrome in cases of abrupt cessation. A knowledge of the pharmacology of nicotine is important in the process of stopping smoking.

52. Bower, B. Smoke gets in your brain. Science News. 143: 46-47. 1993.

COMMENTS: *Very informative article. See also letters to editor Science News, March 6, 1993. (Not included here)* (PJA)

53. Bradstock, M.K., Marks, J.S., Forman, M.R., et al. Drinking-driving and health lifestyle in the United States: Behavioral Risk Factors Surveys. J Stud Alcohol

48(2):147-52, 1987.

ABSTRACT: National patterns of self-reported drinking-driving were examined using aggregated Behavioral Risk Factor Survey data. Drinking-driving is reported by 6.1% of U.S. adults, is almost three times more prevalent among men than women and is most prevalent in 18-24-year-old men (15.4%). Sociodemographic characteristics of self-reported drinking drivers correspond with those characteristics based on alcohol-associated motor vehicle accident and arrest data. Heavy smokers and those who fail to use seatbelts are more likely to drink and drive than those without these health-risk behaviors. Men reporting stress in interpersonal relationships are more likely to drink and drive. Individuals who drink or smoke in response to stress are more likely to drink and drive than those who exercise in response to stress. The concurrent practice of drinking-driving with lack of seatbelt use, use of alcohol in response to stress and smoking probably contributes substantially to the risk of accident and serious injury among drinking drivers and has implications for both prevention and treatment programs.

COMMENTS: *The association of other health risk behaviors with drinking-driving and the public health implications are discussed. The term "multiple lifestyle hazards" is used to describe the clustering of health-risk behaviors. They point out that some researchers have called for a reorganization of prevention efforts to go beyond the prevention of classic risk factors such as drinking and smoking, and to affect the predisposing, reinforcing or enabling factors that underlie the risk factors. As an example, they point out some criticism has been made of programs aimed at reducing the number of youths who drink and drive. These programs typically do not address the underlying issues of why youth drink. Psychosocial stress and how individuals cope with it are also seen as factors that contribute to drinking-driving. Individuals who smoke or drink to relieve stress as opposed to those who exercise are more likely to drink and drive. It is suggested that programs aimed at developing coping skills may reduce health-risk behaviors and thus risk of injury. (JAB)*

54. Bray, M., Krouti, L.A., Luckey, J.W., et al. 1992 World Wide Survey of Substance Abuse and Health Behaviors Among Military Personnel. Washington DC, Research Triangle Institute, 1992.

ABSTRACT: The report presents the results of the 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel. This is the fifth in a series of surveys of military personnel conducted in 1980, 1985, 1988, and 1992 under the direction of the Department of Defense. All the surveys investigated the prevalence of alcohol use, illicit drug use, tobacco use, the consequences of alcohol use and health behaviors other than substance use on the quality of life of military personnel. In 1992, the survey was expanded to give greater emphasis to health risks, knowledge and beliefs about AIDS transmission, and nutrition. In addition, in the 1992 survey, the impact of Operation Desert Shield/Desert Storm on substance use rates was examined; included questions to assess problem gambling in the military; gathered information to estimate medical costs associated with heavy cigarette smoking and drinking among active duty personnel; and made extensive comparisons with national survey data.

55. Breslau, N., Kilbey, M.M. and Andreski, P. Nicotine withdrawal symptoms and psychiatric disorders: findings from an epidemiologic study of young adults. Am J Psychiatry 149(4):464-9, 1992.

ABSTRACT: **OBJECTIVE:** Earlier, the authors reported on the association of nicotine dependence with major depression and anxiety disorders in a group of young adults. This report describes the occurrence of withdrawal symptoms and their sociodemographic and psychiatric correlates in persons in that group who tried unsuccessfully to abstain from smoking. **METHOD:** A random sample of 1,007 members of a health maintenance organization, 21-30 years old, were interviewed with a revised version of the NIMH Diagnostic Interview Schedule. Data on nicotine withdrawal came from a subset of 239 smokers who had

tried unsuccessfully to quit or cut down on smoking. RESULTS: With two exceptions, each of the DSM-III-R nicotine withdrawal symptoms was reported by more than one-half of these smokers. Withdrawal symptoms were more severe in white than in black smokers but were unrelated to sex, educational level, or marital status. Persons with histories of major depression or any anxiety disorder reported more severe withdrawal symptoms than persons with neither of these disorders. Severity of withdrawal, or any specific symptom, did not account for the association between major depression and continued smoking. Furthermore, severity of withdrawal was unrelated to continued smoking. CONCLUSIONS: While the long-term clinical significance of nicotine withdrawal is unclear, the evidence indicates that in the general population, abstinence from smoking is associated with a variety of disturbances, including a craving for cigarettes, dysphoria, and symptoms of irritability or nervousness. In this study disturbances were more severe in persons with histories of major depression or anxiety disorders.

56. Brigham, J., Gross, J., Stitzer, M.L. and Felch, L.J. Effects of a restricted work-site smoking policy on employees who smoke. Am J Public Health 84(5):773-8, 1994.

ABSTRACT: OBJECTIVES. This study evaluated the biological and subjective consequences observed in individual smokers after implementation of a workplace smoking-restriction policy. METHODS. Employees were evaluated for 4 weeks before and 4 weeks after their workplace became smoke-free (n = 34). A comparison group of smokers whose work-site smoking was unrestricted served as controls (n = 33). Daily exposure to tobacco constituents and withdrawal effects were measured. RESULTS. Smokers at the restricted site had verified smoking reduction (mean = four cigarettes per day) and significantly reduced nicotine and carbon monoxide during the work shift. There were increases in ratings of some common withdrawal symptoms (cravings/urges, concentration difficulties, increased eating, depression). No evidence of compensatory smoking during nonwork hours was found. Overall tobacco exposure, as measured in saliva cotinine, showed a nonsignificant 15% decline. CONCLUSIONS. Workplace smoking restriction markedly altered smoking patterns (i.e., reduced daytime smoking) and reduced cotinine levels to an amount consistent with cigarette reduction. Thus, work-site smoking restriction may promote meaningful, albeit limited, reductions in tobacco exposure and consequent health risks.

57. Brison, R.J. Risk of automobile accidents in cigarette smokers [see comments]. Can J Public Health 81(2):102-6, 1990.

ABSTRACT: I used a case-control study to identify an increased risk of motor vehicle crash (MVC) in cigarette smokers as compared to non-smokers. Information on smoking status and potential confounding factors was obtained using a self-administered mail-out questionnaire sent to 1,000 persons known to have had a MVC, and a control group of 1,100 persons with no record of MVC in the previous five years. Assessment of relative risk estimates (RR) and adjustment for confounding factors was done by logistic regression analysis. Smokers had a 1.5-fold increase in risk for MVC over non-smokers ($p = .01$). Also, an increased tendency to smoke while driving was associated with greater risk of MVC (X^2 trend: $p = .01$). The basis for this association may be: 1. distraction from driving by the act of smoking. 2. behavioral differences between smokers and non-smokers. 3. carbon-monoxide toxicity. Further study is needed to determine the importance of these factors as components of the increase in risk found.

COMMENTS: *This clearly written article provides further support to cognitive/behavioral models of tobacco's influence on injury risk. Significant support can now be presented for each of the three models the author suggests in his abstract. Only the first, despite its simplicity, is without empirical data to quantify or substantiate it. There is now good evidence to support the behavioral differences between smokers and non-smokers, and the effects of carbon monoxide are also well documented. This study may be unique in one respect: the unit of analysis isn't injuries, per se; it is motor vehicle crashes. This adds additional support to cognitive/behavioral models, since it is not measuring susceptibility to injury given an impact, but rather likelihood of an accident's occurrence in the first place. (PJA)*

58. Brodzka, W., Thornhill, H.L. and Howard, S. Burns: causes and risk factors. Arch Phys Med Rehabil 66(11):746-52, 1985.

ABSTRACT: In a retrospective study of 277 adult patients consecutively hospitalized for burns over a five-year period (1975-1979) patients' characteristics, circumstances of burn injury and prevalence of established predisposing factors were determined. The average age was 44.5 years, 78% were black and 62% were men. Average extent of burn was 19.7% body surface area. Major causes included flames in 44.8%, scalds in 28.5%, and chemicals in 9.7%. Seventy-four percent of all burns occurred at home. Burns resulting from assault accounted for 20.9%. Fifty-six percent of the patients had one or more of the established predisposing factors. Judged to be predisposed to burn injury were all of those who attempted suicide, all who were using self-treatment for some preexisting conditions, 85% of the elderly, 83% of those who died, 81% of those burned in the bathtub and 80% of those assaulted. Other described groups were also at high risk. Living alone increased risk of injury in persons prone to burn. The most common predisposing factors were alcohol and drug abuse, physical and mental illness and advanced age. Mortality rate was 12.6%. This study emphasizes the urgent need for effective burn prevention programs in which all health professionals should play an important role.

COMMENTS: *This study discusses burns which were directly caused by smoking. "All age groups were represented among the 22 men and 15 women having burns resulting from smoking; most were young or middle aged. In all instances, a dropped cigarette or match had ignited clothing, usually pajamas or a nightgown. Burning of the mattress or a sofa happened in numerous instances. Of the 37 cigarette-smoking-related accidents, 30 (81%) occurred at home and 4 in a health care facility. In 27% of these cases, the scenario involved a person falling asleep in bed with a cigarette. One woman, the only non-smoker in the group, sustained burns while painting her apartment when a match was dropped by someone else. Smoking while handling flammable liquids caused burns in three persons."* (PJA)

59. Broulik, P.D. and Jarab, J. The effect of chronic nicotine administration on bone mineral content in mice. Horm Metab Res 25(4):219-21, 1993.

ABSTRACT: Tobacco use has been identified as being a risk factor for the development of osteoporosis. To elucidate the effect of nicotine on bone metabolism we examined 8 intact and 8 castrated mice treated for 56 days with nicotine in drinking water and compared with the same number of mice acting as controls. The mineral bone mass in the femora of the animals was measured quantitatively. A significant reduction of bone density and bone mineral content was found in the nicotine treated animals compared to animals without nicotine. Nicotine itself does not exert any antiandrogenic effect, and it does not produce changes in the weight of seminal vesicles.

60. Carleton, R.A., Ignani, E., Stewart, K. and Dorval, J. Fire deaths from smoking [letter]. N Engl J Med 301(7):389, 1979.

61. Centers for Disease Control and Prevention. Reasons for tobacco use and symptoms of nicotine withdrawal among adolescent and young adult tobacco users -- United States, 1993. JAMA 272(21):1648-9, 1994.

COMMENTS: *This study examined the reasons for tobacco use among adolescents. Principle reasons given for smoking were relaxation, and difficulty quitting. This report emphasizes the psychopharmacological effects of nicotine.* (JAB)

62. Chow, C.K. Cigarette smoking and oxidative damage in the lung. Ann N Y Acad Sci 686:289-98, 1993.

ABSTRACT: Cigarette smoke contains a large variety of compounds, including many oxidants and free radicals that are capable of initiating or promotes oxidative damage. Also, oxidative damage may result from reactive oxygen species generated by the increased and activated phagocytes following cigarette smoking. In vitro studies are generally supportive of the hypothesis that cigarette smoke can initiate or promote oxidative damage. However, information obtained from in vivo studies is inconclusive. Contrary to expectations, the levels of lipid peroxidation products were found to be decreased or unchanged in the lungs of chronically smoked rats. Metabolic adaptation, such as accumulation of vitamin E in the lung, and increased activities of superoxide dismutase in alveolar macrophages and pulmonary tissues of chronically smoked animals may enable smoked subjects to counteract oxidative stress and to resist further damage to smoke exposure. However, it is also possible that the metabolic adaptation may be secondary to inflammatory response and injury repair process following smoking exposure. More studies are needed to better understand the role of oxidative damage in the etiology of smoking-related disorders.

63. Christen, W.G., Manson, J.E., Seddon, J.M., et al. A prospective study of cigarette smoking and risk of cataract in men [see comments]. JAMA 268(8):989-93, 1992.

ABSTRACT: **OBJECTIVE:** To examine the association between cigarette smoking and the incidence of cataract. **DESIGN, SETTING, AND PARTICIPANTS:** The design was a prospective cohort study using data from the Physicians' Health Study, a randomized trial of aspirin and beta carotene among 22,071 US male physicians aged 40 to 84 years that began in 1982. This analysis includes the 17,824 physicians who did not report cataract at baseline and did provide complete risk factor information. Based on information reported at baseline, 10% were current smokers, 39% were past smokers, and 51% were never smokers. **MAIN OUTCOME MEASURE:** An incident cataract was defined as a self-report confirmed by medical record review to have been first diagnosed after randomization, age-related in origin, and responsible for a decrease in best corrected visual acuity to 20/30 or worse. **MAIN RESULTS:** During 60 months of follow-up, 557 incident cataracts among 371 participants were confirmed. Compared with never smokers, current smokers of 20 or more cigarettes per day had a statistically significant increase in the risk of cataract (relative risk [RR], 2.16; 95% confidence interval [CI], 1.46 to 3.20; P less than .001). Similar results were obtained after simultaneously controlling for other potential cataract risk factors in a logistic regression model (RR, 2.05; 95% CI, 1.38 to 3.05; P less than .001). Among the 557 eyes with cataract, nuclear sclerotic changes were present in 442 while posterior subcapsular changes were present in 204. After controlling for other potential cataract risk factors, current smokers of 20 or more cigarettes per day had statistically significant increases in nuclear sclerosis (RR, 2.24; 95% CI, 1.47 to 3.41; P less than .001) and posterior subcapsular (RR, 3.17; 95% CI, 1.81 to 5.53; P less than .001) cataract. Past smokers had an elevated risk of posterior subcapsular (RR, 1.44; 95% CI, 0.97 to 2.13; P = .07) but not nuclear sclerosis cataract. For current smokers of fewer than 20 cigarettes per day, no increased risks were observed of total, nuclear sclerosis, or posterior subcapsular cataract. **CONCLUSIONS:** These data provide support for the hypothesis that cigarette smoking increases the risk of developing both nuclear sclerosis and posterior subcapsular cataract.

COMMENTS: *Cigarette smoking increases the risk of developing both nuclear sclerosis and posterior subcapsular cataract -- add two more morbidity causes to tobacco's list. Cataracts, given their obvious adverse impact on vision, could also increase one's risk of injury -- especially while operating an automobile at night. (PJA)*

64. Christie, R. Smoking and Traffic Accident Involvement: a Review of the Literature. Melbourne, Road Safety Division; VICROADS, Report No. GR/91-3, 1991.

65. Cliff, K.S., Grout, P. and Machin, D. Smoking and attitudes to seat belt usage. Public Health 96(1):48-52, 1982.

ABSTRACT: An evaluation of a health education program promoting the use of seat belts as an injury protection measure in vehicle collision accidents, was carried out using a postal questionnaire to a random sample of people drawn from the electoral rolls of a local authority. The questionnaire asked respondents to provide information about their habits and opinions on a number of aspects including seat belt wearing habits: cigarette consumption, age, sex, driver or non-driver of a motor vehicle, opinion on legislation to enforce seat belt wearing, and opinion on a reduction in car insurance premium for seat belt wearers. Allowing for age and sex amongst drivers, self-reported seat belt wearing declined as cigarette consumption rose ($P<0.01$). Analysis of the data related to "opinions on legislation to enforce seat belt wearing" by means of logit-linear models indicated that age was the only variable which, when considered alone, was found to influence the response ($P<0.05$). If the two variables, cigarette consumption and drivers were added in an interactive mode, then there was a significant improvement in the fit as compared to age alone ($P<0.05$). This improvement was not found in respect of "opinions relating to insurance premium reduction", age-sex being the only interaction which was significantly associated with response ($P<0.05$).

COMMENTS: *The proportion of drivers wearing seat belts decreases with increasing cigarette consumption in an approximately linear fashion. This finding has implications for injury prevention. Obviously the first concern may be the rate and severity of injuries sustained in motor vehicle accidents among smokers, but there may also be implications for other injuries. Smokers may tend to be greater risk-takers and thus more susceptible to injury. (JAB)*

66. Cohen, S.B. Don't let the patient smoke [letter; comment]. Hosp Community Psychiatry 41(7):806, 1990.

67. Cohen, C., Pickworth, W.B., Bunker, E.B. and Henningfield, J.E. Caffeine antagonizes EEG effects of tobacco withdrawal. Pharmacol Biochem Behav 47(4):919-36, 1994.

ABSTRACT: Six current cigarette smokers and coffee drinkers were given combinations of 0, 150, or 300 mg caffeine and 0, 2, or 4 mg nicotine polacrilex following 12-h nicotine and caffeine abstinence. On one study day, subjects were allowed to smoke cigarettes and to drink caffeinated beverages and no drugs were given. Tobacco and caffeine abstinence impaired performance on the serial addition/subtraction and digit recall tasks; decreased scores on the MBG scale and ratings of clear-headed and quick-witted; and increased ratings of irritability, muscular tension, headache, drowsy, clumsy, feeble, and dreamy. The deprivation caused characteristic EEG signs of nicotine withdrawal including increased theta power and decreased alpha frequency. These EEG effects were reversed by cigarette smoking and caffeine administration, but nicotine polacrilex was less effective. Deprivation-induced performance and subjective measures were not changed by administration of nicotine and caffeine combinations.

67b. Confirmed: Smoking delays bone union. Orthopedics Today. 15:1, 23, 1995.

COMMENTS: *This article provides excerpts of an abstract presented at the annual meeting of the Orthopedic Trauma Association. The authors were Miguel Schmitz, Maureen Finnegan, and Julie Champine. Their study found that tibial shaft fractures take up to 70% longer to heal in smokers. Smokers took an average of 268 days before return to full weight bearing without pain vs. 159 days for nonsmokers. Patients in the smoking group smoked five or more cigarettes per day and averaged 21 per day. Five patients in the nonsmoking group were exsmokers, and 5 patients in the nonsmoking group smoked one to five cigarettes per day. The*

average age of the smokers was 33, and the average age of the nonsmokers was 37. Race, sex, mechanism of injury, and the distribution of the type of treatment were similar between the two groups. (PJA)

68. Conway, T.L., Vickers, R.R.J., Ward, H.W. and Rahe, R.H. Occupational stress and variation in cigarette, coffee, and alcohol consumption. J Health and Soc Behav 22:155-165, 1981.

ABSTRACT: The impact of occupational stress on self-reported cigarette, coffee, and alcohol consumption was investigated in a longitudinal field study. Substance consumption and subjective stress indicators were measured repeatedly for 34 men performing a job with known systematic variation in stress. Habitual cigarette smoking and coffee drinking were positively associated with chronic tendencies to perceive high stress; no associations were found between chronic alcohol consumption and stress perceptions. Consumption of all three substances varied significantly across days that differed in perceived stress level. On the average, there was more cigarette smoking and more coffee drinking, but less alcohol consumption, under high stress. These general effects of stress appeared to depend largely on the behavior of only a few of the participants, as the association between subjective stress indicators and substance consumption within individuals was not consistent across all of them. These findings suggest that there can be important individual differences in the tendency to increase or decrease habitual substance consumption in response to varying levels of stress. This possibility should be considered when constructing models that include behavioral responses to stress.

COMMENTS: Authors found that cigarette smoking was highly correlated with perceived levels of stress. This may suggest a broader personality issue surrounding the smoking and injury relationship. Smokers and, in particular, heavy smokers may tend to be highly excitable and reactive individuals. These traits may also make them more susceptible to injury. (JAB)

69. Cotrau, M. [Exogenous substances as the cause of accidents]. Rev Med Chir Soc Med Nat Iasi 82(4):687-90, 1978.

70. Creath, C.J., Shelton, W.O., Wright, T.J., et al. The prevalence of smokeless tobacco use among adolescent male athletes. JADA 116(January):37-41, 1988.

ABSTRACT: Smokeless tobacco currently presents a health problem for millions of Americans, and its use appears to be continually growing in popularity. The purpose of this study was to determine the prevalence of smokeless tobacco use among adolescents athletes, the characteristics of its use, and the prevalence of associated abnormal mucosal findings. Study results indicate that health care providers-in particular, dentists-must take a more active role in educating and monitoring patients who use smokeless tobacco.

71. Cummings, S.R., Kelsey, J.L., Nevitt, M.C. and O'Dowd, K.J. Epidemiology of osteoporosis and osteoporotic fractures. Epidemiol Rev 7:178-207, 1985.

ABSTRACT: Osteoporosis and associated fractures are common in Western countries, especially among elderly white women. In the United States alone, the total cost of osteoporosis and osteoporotic fractures was estimated to be 6.1 billion dollars in 1983 (1). In addition to enormous economic costs, these fractures cause considerable disability and many premature deaths. As the number of elderly increases, so will the magnitude of the problem. Consequently, the public, health professionals, and policymakers have become increasingly concerned about prevention of osteoporosis and osteoporotic fractures (2). Osteoporosis may be defined as a reduction in bone mass that increases susceptibility to

fracture (2). Defining osteoporosis more precisely is difficult since, for specific age and sex, there is a wide, continuously distributed range of bone mass and no distinctly separate group of people with low bone mass (3-6). Average bone mass tends to decrease after the fourth or fifth decade in all populations studied so far, so that bone loss may be considered an almost universal phenomenon of aging (3-21). Osteoporosis predisposes to fractures of the (22-24), vertebrae (17, 25-29), distal forearm (Colles' fractures) (30, 31), humerus (32), pelvis (33), and other, less common types of fractures (33, 34). With sufficient force of injury, these fractures can occur in anyone, but they are considered to be "osteoporotic" when they occur in the elderly or as the result of minimal trauma (no severe than that resulting from falling from a standing height) (22-24, 30-33).

72. Cummings, S. and Richard, R. Optimum cutoff points for biochemical validation of smoking status. Am J Public Health 78:574-575, 1988.

ABSTRACT: Selection of cutoff points for tests to validate smoking cessation should take account of the prevalence of deception is relatively low, the cutoff points to validate quitting should be relatively high. Many have used cutoff points that are too low and may have underestimated cessation rates. We present a method of presenting the best cutoff points that takes account of prevalence of deception.

73. Daftari, T.K., Whitesides, T.E., Jr., Heller, J.G., et al. Nicotine on the revascularization of bone graft. An experimental study in rabbits. Spine 19(8):904-11, 1994.

ABSTRACT: **STUDY DESIGN:** In 24 rabbits, the authors transplanted autologous cancellous bone to the anterior chamber of the eye. Half of the rabbits received nicotine and half received placebo (albumin) from mini-osmotic pumps that were implanted subcutaneously. Revascularization of the bone graft was evaluated postoperatively using ophthalmology slit-lamp and fluorescein angiography, and after sacrifice using microvascular silicone injection and histology. **OBJECTIVES:** The hypothesis that nicotine inhibits the revascularization of bone graft because of its pharmacologic action on the microvasculature was tested. **SUMMARY OF BACKGROUND DATA:** Pseudoarthrosis after spinal fusion occurs more frequently in smokers as compared with non-smokers. **METHODS:** Observations of the bone graft were made regarding the time after implantation when vessels within the graft were noted and the pattern of these vessels. Revascularization of the graft was graded based on the observed percent area of fluorescence after injection of fluorescein. Serum levels of nicotine were measured weekly. Colored silicone was injected at sacrifice to fix the vasculature of the bone graft. Histologic analysis of undecalcified sections was performed. **RESULTS:** Nicotine, as compared with placebo, was associated with delayed revascularization within the graft, a smaller percent area of revascularization, and a larger number of grafts showing necrosis. **CONCLUSIONS:** Nicotine inhibits, but does not prevent, the revascularization of cancellous bone grafts. Inhibition of early revascularization by nicotine is proposed as the pathophysiologic mechanism by which smoking may adversely affect the healing of spinal fusions.

74. Daniel, M., Martin, A.D. and Faiman, C. Sex hormones and adipose tissue distribution in premenopausal cigarette smokers. Int J Obes Relat Metab Disord 16(4):245-54, 1992.

ABSTRACT: Androgen dominance is associated with android (abdominal) adiposity and increased health risk. Cigarette smoking has an anti-estrogenic effect in women and recent evidence has linked cigarette smoking with abdominally-localized adipose tissue. The relationship between cigarette smoking, endogenous sex steroid levels and adipose tissue distribution in women has not been examined. We assessed anthropometric indicators of fat distribution and serum levels of estradiol, testosterone and sex hormone-binding globulin (SHBG) in 56 women aged 20-35 years (27 cigarette smokers and 29 non-smokers). Free estradiol and testosterone were estimated. Endocrine and anthropometric variables were

adjusted for overall fatness. Cigarette smokers had significantly higher mean serum levels of SHBG than non-smokers (63.38 nmol/l and 57.85 nmol/l, respectively; P less than 0.01); there were no differences in serum estradiol, testosterone or estimated free levels of these sex steroids. Cigarette smokers had a more android distribution of adipose tissue: significantly greater waist-to-hip ratio (WHR) (P less than 0.01), greater waist-to-thigh ratio (WTR) (P less than 0.02) and smaller thigh girth (P less than 0.05). Waist and umbilical girths were greater in cigarette smokers (P less than 0.0002), but there was no difference in the sum of central skinfold thicknesses (abdominal, iliac crest and supra-spinale). A significant interaction (P less than 0.05) of cigarette smoking with serum testosterone levels was observed in effects on WHR; the relative impact of serum testosterone upon abdominal adiposity was greater in cigarette smokers than in non-smokers. The results suggest that in premenopausal women, cigarette smoking promotes android adiposity by increasing abdominal fat deposition and decreasing femoral fat deposition via interactive effects with sex steroids. The results also suggest an effect of cigarette smoking on serum SHBG, independent of effects on androgen/estrogen balance.

75. Daniell, H.W. Osteoporosis and smoking. JAMA 221(5):509, 1972.

76. Daniell, H.W. Osteoporosis of the slender smoker. Vertebral compression fractures and loss of metacarpal cortex in relation to postmenopausal cigarette smoking and lack of obesity. Arch Intern Med 136(3):298-304, 1976.

ABSTRACT: A group of thirty-eight women under age 70 who sustained vertebral compression fractures during minor trauma included more postmenopausal smokers than a group of 34 similar women with fractures resulting from major trauma and more than a group of 572 other women. Advanced idiopathic osteoporosis occurring before age 65 was found rarely among non-smokers. The percent cortical area at the second metacarpal midpoint was measured in 103 white women aged 40 to 49 years, and 208 white women aged 60 to 69 years. In the younger group, no quantitative differences were demonstrated between bones of the obese and the nonobese or between smokers and non-smokers. In contrast, among the older group, postmenopausal smokers exhibited much more bone loss than did non-smokers (P less than .001), and nonobese women demonstrated much more bone loss than did obese women, this difference being most striking among smokers.

77. Dawson, D.A. Heavy drinking and the risk of occupational injury. Accid Anal Prev 26(5):655-65, 1994.

ABSTRACT: This study evaluated the association between the frequency of heavy drinking and the risk of occupational injury, using nationally representative data from the 1988 National Health Interview Survey (NHIS). The sample consisted of 29,192 adults who were employed at some time during the year preceding the NHIS interview. Overall, 7.2% reported an on-the-job injury during the preceding year, but the rates were higher--about 13%--for those employed as skilled or unskilled laborers or who reported engaging in repeated strenuous physical activity at work. Slightly more than one-fourth of the employed adults reported at least one occasion of drinking five or more drinks during the preceding year. After adjusting for the effects of age, gender, education, occupation, and strenuous job activity, the odds of occupational injury increased with frequency of heavy drinking, with odds ratios varying from 1.08 (one occasion of heavy drinking) to 1.74 (daily heavy drinking). Odds ratios were decreased slightly by the inclusion of smoking as a control variable, indicating that some of the excess risk of injury among heavy drinkers may reflect their greater propensity to take health-related risks rather than direct effects of ethanol. The odds ratios also were slightly lower when the analysis was restricted to current drinkers, suggesting that the risk of work injury was increased by light or moderate as well as heavy drinking.

78. Dettori, J.R., Reynolds, K.L., Amoroso, P.J., Barnes, J.A., Westphal, K.A. and Lavin, P.T. Smoking and Injury Risk Among Female US Army Basic Combat Trainees. Third

International Conference for Injury Prevention and Control, Melbourne, Australia, 1996.

CONFERENCE ABSTRACT SUMMARY: Physical training-related injuries are common among army recruits. Injury rates as run as high as 13.7/100/mo. in males and 25.0/100/mo. in females. These high rates are generally attributed to the intense physical activity and strenuous exercise that accompany basic combat training. Risk factors associated with training injuries are not completely identified, however more is known about male risk factors for injury than female. The table below summarizes these findings.

POSSIBLE RISK FACTORS	MALE RECRUITS	FEMALE RECRUITS
• Older Age	(+)	(-)
• Increased Body Fat	(+)	(-)
• Low Aerobic Endurance	(+)	(+)
• Low Muscle Endurance	(+)	(-)
• Smoking	(+)	(?)

Recently, smoking as a risk factor associated with training injuries has been identified in male infantry soldiers as well as in recruits. One study suggests that smoking is associated with stress fractures in female soldiers. Until now, no study has evaluated the association of smoking with all types of injuries in female recruits. The purpose of this study is to determine the effect of smoking on the risk of musculoskeletal injuries among women undergoing initial basic combat training (BCT) in the United States Army.

METHODS: BCT is an 8-week course designed to provide an individual with "soldierization skills". Upon arrival, males must be able to perform 13 push-ups, while females must be able to complete 1 push-up to progress to a training company. Once in the training company, all soldiers follow the same schedule each day which includes physical training, road marching and classwork. Graduation from BCT requires proficiency in marksmanship with an M-16 rifle, the Army Physical Fitness Test (APFT) and basic soldiering skills. Subjects were 165 female Army trainees from a single basic training company. This study included a baseline and follow-up evaluation. At baseline (prior to the onset of training), we collected demographic and behavior habits, body stature, and fitness measurements of muscular strength, muscular endurance and aerobic endurance. We obtained follow-up data at the end of the eight weeks of training. A single physician documented all injuries during basic training by reviewing the medical records of each study participant. The cumulative incidence of individuals with one or more injuries was used in the analysis.

Definitions: *Injury cases* - any individual recorded as having reported to sick call for one or more musculoskeletal injuries. *Overuse injuries* - musculoskeletal injuries suspected to be caused by repetitive microtrauma associated with such activities as running and marching. This included stress fractures, stress reactions, tendinitis, fasciitis and similar types of injuries. *Traumatic injuries* - musculoskeletal injuries resulting from a single traumatic event (e.g., twisting an ankle in a pot hole). This category included sprains, contusions and fractures. *Days lost* - number of duty days lost to training due to an injury requiring rest.

RESULTS

Mean Age (yrs)	21.4	(±3.5)
Mean Height (cm)	162.9	(±6.5)
Mean Weight (kg)	62.2	(±9.0)
Mean Body Mass Index (kg/m ²)	23.4	(±2.6)
Mean Initial Fitness Scores		
Two Mile Run Time (min)	27.3	(±3.2)
Pushups (#)	9.3	(±8.9)

Situps (#)	34.6 (± 13.4)
Smokers # (%)	53 (32.5 %)

THE RISK (%) OF INJURY DURING 8 WEEKS OF CBT AND THE # OF LOST DUTY DAYS

	INJURED (%)	INJURY RATE (mo-1)	DAYS LOST (#)
All Types	66.7	33/100	1273
Overuse	74.0		1019
Traumatic	19.1		230
Wounds	6.8		24

SMOKING STATUS	ALL INJURIES* OR (95% CI)	OVERUSE INJURY† OR (95% CI)	TRAUMATIC INJURY‡ OR (95% CI)
Current	3.10 (1.11,8.67)	2.12 (0.87,5.16)	2.14 (0.81,5.68)
Former (<6 mos)	2.80 (1.12,6.97)	2.41 (1.06,5.48)	1.43 (0.58,3.54)
Former(>6 mos)	1.29 (0.20,5.93)	1.61 (0.37,7.11)	1.48 (0.31,7.14)

*controlling for run time and body weight

†controlling for run time and pushups

‡controlling for run time and body mass index

CONCLUSIONS 1. Smoking significantly increases the risk of sustaining a musculoskeletal injury in female Army basic trainees. 2. This risk occurs in both overuse and traumatic injuries. 3. Former smokers have a slightly higher risk of overuse compared to traumatic injuries.

79. Deyo, R.A. and Bass, E.J. Lifestyle and low-back pain: the influence of smoking and obesity. Spine 14(5):501-6, 1989.

ABSTRACT: The authors examined associations between back pain prevalence and lifestyle factors (smoking and obesity) using national survey data. Back pain prevalence rose with increasing levels of smoking, with a relative risk of 1.47 for persons reporting 50 or more pack-years of smoking. This association was strongest in persons under the age of 45 years, however, for whom the corresponding relative risk was 2.33. There were similar trends toward greater prevalence with increasing body mass index, but prevalence rose substantially only in the most obese 20% of the subjects (1.7 times higher than the lowest 20%). In a logistic regression, smoking and obesity contributed independent risk, even after controlling for age, education, exercise level, and employment status. Programs for back pain prevention may wish to test interventions for these lifestyle-related factors.

COMMENTS: *This study used NHANES II survey data to examine the association between back pain and smoking and obesity. The attributable risk of smoking was calculated to be 1.3 cases per 100 persons. The population attributable fraction was 7% of the 1-year period prevalence. Extrapolating this to the U.S. population would represent 640,000 cases of back pain due to smoking per year. (JAB)*

80. Dieck, G.S. and Kelsey, J.L. An epidemiologic study of the carpal tunnel syndrome in an adult female population. Preventive Medicine 14:63-69, 1985.

ABSTRACT: The relationships between certain reproductive, demographic, and medical variables and the carpal tunnel syndrome were examined using data from a hospital-based case-control study of women

ages 45-74 years in the New Haven and Hartford, Connecticut, areas from 1977 to 1979. Characteristics of 40 carpal tunnel syndrome cases and 1,043 controls from hospital surgical services were compared. A history of diabetes was associated with and increased frequency of occurrence of the carpal tunnel syndrome, a finding consistent with clinical observation. Recent weight gain and use of estrogen replacement therapy were identified as possible risk factors; this provides some support for the theory that fluid retention in the soft tissues of the carpal tunnel is etiologically involved, although these results are preliminary and further research must be carried out to refute or support these findings. The negative association of the carpal tunnel syndrome with height and history of varicose veins and the positive association with age at menopause cannot be explained and need verification.

81. DiFranza, J.R. and Winters, T.H. Smoking and drunk driving [letter]. N Engl J Med 313(22):1421-2, 1985.

COMMENTS: *In their letter to the editor, DiFranza and Winters make a convincing case that alcohol and tobacco use are closely linked. This does not, however, eliminate the potential primary contribution of tobacco use to injury risk or susceptibility. (PJA)*

82. DiFranza, J.R., Winters, T.H., Goldberg, R.J., Cirillo, L. and Biliouris, T. The relationship of smoking to motor vehicle accidents and traffic violations. N Y State J Med 86(9):464-7, 1986.

ABSTRACT: Differences between smokers and non-smokers in the frequency of motor vehicle accidents and traffic violations were examined in two populations. Self-administered questionnaires were used to collect data on these outcomes as well as on smoking habits, drinking habits, age, gender, marital status, education, years of driving experience, and number of miles driven annually. Smokers had 50% more traffic accidents and 46% more violations than non-smokers. The excess of accidents and violations among smokers remained when differences in alcohol consumption, age, driving experience, and education were taken into account, and may reflect in part more frequent risk taking behavior among smokers.

COMMENTS: *The first population consisted of drivers who had received traffic tickets for minor violations and were given the option of attending a three-hour traffic safety course in exchange for having the violation annulled. Drivers who were stopped for drunken driving or who received a ticket as a result of an accident were excluded. The second population consisted of individuals who were applying for license renewals at the Registry of Motor Vehicles. Subjects were asked the number of traffic accidents and moving violations they had had during the previous year. Smokers in the first group were found to have a relative risk of 1.46 when compared to non-smokers of having had a traffic accident in the previous year. Smokers in the second group were found to have a relative risk of 1.25 of having incurred one or more traffic violations in the previous year. The authors suggest that smokers have different personality traits which may influence their driving behavior and thus lead to the reported results. They point out that previous research has shown that smokers tend to show more impulsivity, immaturity, extroversion, sociopathy and poor mental health. These traits have also been shown in individuals who are frequently involved in motor vehicle accidents. (JAB)*

83. Dille, J.R. and Linder, M.K. The Effects of Tobacco on Aviation Safety. Report No. FAA-AM-80-11, 1980.

ABSTRACT: In 1976, the FAA was petitioned to issue regulations that would prohibit all smoking in the cockpit during commercial flight operations and prohibit preflight smoking by flight crewmembers within 8 hours before commercial flight operations. A review of the literature was conducted to determine the effects on pilot performance of carbon monoxide (CO), nicotine, and smoking withdrawal. The literature is

confusing because it frequently contains the results of studies using non-smokers, CO only, estimated carboxyhemoglobin (COHb) levels, small and poorly ventilated chambers, and discrimination tasks where spare capacity is not a factor. Some frequently quoted results cannot be duplicated. Significant changes in psychomotor and cardiovascular performance with COHb levels less than 10 percent are doubtful. The records of 2,660 fatal general aviation aircraft accidents that occurred in 1973 through 1976 have been examined. Toxicology reports are contained in 1,559 records, and 225 without fire had COHb levels greater than 1 percent. Smoking was not identified as a causal factor but may have contributed to the cause of some of these accidents. However, the compound factors that were often found and the dire consequences are far less likely to occur in air commerce operations. For some, withdrawal symptoms may occur and more than offset any benefits to aviation safety that are claimed for a ban on preflight and in-flight smoking. (Author)

84. Doege, T.C. Illness and crashes -- is there a relationship? Journal of Safety Research 19:145-50, 1988.

ABSTRACT: Except in the instances of alcohol intoxication and, possibly, heart disease and epilepsy, the data are meager regarding the effects of acute illness and chronic impairments as factors in motor vehicle crashes. Based on past studies and current statistics, it is estimated that each year in the U.S. perhaps 1,700 injury-producing crashes and as many as 1,500 fatalities may be due to drivers' illnesses or medical conditions other than alcohol intoxication. The designs and descriptions of most studies of this subject do not inspire confidence in their results from an epidemiologic and scientific viewpoint. Physicians should be knowledgeable about the major issues involving highway safety and about the medical qualifications their patients need to drive different types of vehicles within their home states and in interstate commerce.

85. Doll, R. and Peto, R. Mortality in relation to smoking: 20 years' observations on male British doctors. BMJ 2(6051):1525-36, 1976.

ABSTRACT: In 1951 the British Medical Association forwarded to all British doctors a questionnaire about their smoking habits, and 34440 men replied. With few exceptions, all men who replied in 1951 have been followed for 20 years. The certified causes of all 10 072 deaths and subsequent changes in smoking habits were recorded. The ratio of the death rate among cigarette smokers to that among lifelong non-smokers of comparable age was, for men under 70 years, about 2:1, while for men over 70 years it was about 1.5:1. These ratios suggest that between a half and a third of all cigarette smokers will die because of their smoking, if the excess death rates are actually caused by smoking. To investigate whether this is the case, the relation of many different causes of death to age and tobacco consumption were examined, as were the effects of giving up smoking. Smoking caused death chiefly by heart disease among middle-aged men (and, with a less extreme relative risk, among old men,) lung cancer, chronic obstructive lung disease, and various vascular diseases. The distinctive features of this study were the completeness of follow-up, the accuracy of death certification, and the fact that the study population as a whole reduced its cigarette consumption substantially during the period of observation. As a result lung cancer grew relatively less common as the study progressed, but other cancers did not, thus illustrating in an unusual way the causal nature of the association between smoking and lung cancer.

COMMENTS: *Only suicide and poisoning were found to be significantly related to smoking status (Chi sq for trend >3.84, P<0.05). The authors placed this finding under the category of "Attributed to causes other than smoking (including chance)." (PJA)*

86. Doll, R., Peto, R., Hall, E., Wheatley, K. and Gray, R. Mortality in relation to consumption of alcohol: 13 years' observations on male British doctors. BMJ 309(6959):911-8, 1994.

ABSTRACT: OBJECTIVE: To assess the risk of death associated with various patterns of alcohol consumption. DESIGN: Prospective study of mortality in relation to alcohol drinking habits in 1978, with causes of death sought over the next 13 years (to 1991). SUBJECTS: 12,321 British male doctors born between 1900 and 1930 (mean 1916) who replied to a postal questionnaire in 1978. Those written to in 1978 were the survivors of a long running prospective study of the effects of smoking that had begun in 1951 and was still continuing. RESULTS: Men were divided on the basis of their response to the 1978 questionnaire into two groups according to whether or not they had ever had any type of vascular disease, diabetes, or life threatening disease and into seven groups according to the amount of alcohol they drank. By 1991 almost a third had died. All statistical analyses of mortality were standardized for age, calendar year, and smoking habit. There was a U shaped relation between all cause mortality and the average amount of alcohol reportedly drunk; those who reported drinking 8-14 units of alcohol a week (corresponding to an average of one to two units a day) had the lowest risks. The causes of death were grouped into three main categories: alcohol augmented causes (6% of all deaths: cirrhosis, liver cancer, upper digestive (mouth, esophagus, larynx, and pharynx) cancer, alcoholism, poisoning, or injury), ischemic heart disease (33% of all deaths), and other causes. The few deaths from alcohol augmented causes showed, at least among regular drinkers, a progressive trend, with the risk increasing with dose. In contrast, the many deaths from ischemic heart disease showed no significant trend among regular drinkers, but there were significantly lower rates in regular drinkers than in non-drinkers. The aggregate of all other causes showed a U shaped dose-response relation similar to that for all cause mortality. Similar differences persisted irrespective of a history of previous disease, age (under 75 or 75 and older), and period of follow up (first five and last eight years). Some, but apparently not much, of the excess mortality in non-drinkers could be attributed to the inclusion among them of a small proportion of former drinkers. CONCLUSION: The consumption of alcohol appeared to reduce the risk of ischemic heart disease, largely irrespective of amount. Among regular drinkers mortality from all causes combined increased progressively with amount drunk above 21 units a week. Among British men in middle or older age the consumption of an average of one or two units of alcohol a day is associated with significantly lower all cause mortality than is the consumption of no alcohol, or the consumption of substantial amounts. Above about three units (two American units) of alcohol a day, progressively greater levels of consumption are associated with progressively higher all cause mortality.

87. Doll, R., Peto, R., Wheatley, K., Gray, R. and Sutherland, I. Mortality in relation to smoking: 40 years' observations on male British doctors [see comments]. BMJ 309(6959):901-11, 1994.

ABSTRACT: OBJECTIVE: To assess the hazards associated with long term use of tobacco. DESIGN: Prospective study of mortality in relation to smoking habits assessed in 1951 and again from time to time thereafter, with causes sought of deaths over 40 years (to 1991). Continuation of a study that was last reported after 20 years' follow up (1951-71). SUBJECTS: 34,439 British male doctors who replied to a postal questionnaire in 1951, of whom 10,000 had died during the first 20 years and another 10,000 have died during the second 20 years. RESULTS: Excess mortality associated with smoking was about twice as extreme during the second half of the study as it had been during the first half. The death rate ratios during 1971-91 (comparing continuing cigarette smokers with life-long non-smokers) were approximately threefold at ages 45-64 and twofold at ages 65-84. The excess mortality was chiefly from diseases that can be caused by smoking. Positive associations with smoking were confirmed for death from cancers of the mouth, esophagus, pharynx, larynx, lung, pancreas, and bladder; from chronic obstructive pulmonary disease and other respiratory diseases; from vascular diseases; from peptic ulcer; and (perhaps because of confounding by personality and alcohol use) from cirrhosis, suicide, and poisoning. A negative association was confirmed with death from Parkinson's disease. Those who stopped smoking before middle age subsequently avoided almost all of the excess risk that they would otherwise have suffered, but even those who stopped smoking in middle age were subsequently at substantially less risk than those who continued to smoke. CONCLUSION: Results from the first 20 years of this study, and of other

studies at that time, substantially underestimated the hazards of long term use of tobacco. It now seems that about half of all regular cigarette smokers will eventually be killed by their habit.

COMMENTS: *This study confirms the findings of the 20-year study, finding the same association between smoking and suicide and poisoning. The authors attribute this finding to personality factors and confounding, primarily from alcohol. There was not a higher incidence of traffic accident deaths among the smokers in this cohort. Perhaps even more remarkable was the seemingly low rates of injury death overall (only 4.0% of total deaths). (PJA)*

88. Domino, E.F. and von Baumgarten, A.M. Tobacco cigarette smoking and patella reflex depression. Clinical Pharmacological Ther 10:72-79, 1969.

89. Dovgan, P.S., Edwards, J.D., Zhan, X., Wilde, M. and Agrawal, D.K. Cigarette smoking increases monocyte adherence to cultured endothelial cell monolayer. Biochem Biophys Res Commun 203(2):929-34, 1994.

ABSTRACT: Leukocyte adherence to endothelium represents one of the early responses to injury. Although the underlying mechanisms of atherosclerosis and intimal hyperplasia remain unclear, monocytes/macrophages are associated with this phenomenon. Since cigarette smoking has been identified as a major risk factor for cardiovascular disease, we examined the effects of chronic cigarette smoking on human leukocyte adherence (monocytes, lymphocytes, and neutrophils) to cultured human umbilical vein endothelial cells (HUVEC's) in vitro. Among the cells, the basal adherence of monocytes only was significantly elevated in the smoking group ($p < 0.05$) compared to the non-smokers. Furthermore, the increase is related to increasing pack per day consumption ($p < 0.01$). These novel data suggest an alteration of the circulating monocytes by cigarette smoking, resulting in increased adherence to endothelial cells.

90. Dyer, F.N. Smoking and Soldier Performance: A Literature Review. Defense Technical Report No. #AD-A221 504, 1986.

ABSTRACT: Research was reviewed on smoking as it relates to soldier performance for the US Army Medical Research and Development Command. This literature review resulted from an unsolicited proposal submitted by Research Solutions, Incorporated, in response to the Broad Agency Announcement of the Command. Research on smoking and other nicotine effects was included in the review. The research reviewed was related to position, work capacity and endurance; the effects of smoking on perceptual processes; the effects of smoking on arousal and ability to deal with stress, pain, and fear; smoking-induced hormonal changes; the effects of tobacco deprivation; smoking-disease, and their effects on productivity and absenteeism; smoking and associations between smoking and other factors of potential relevance to soldier performance. Among the main findings, the review also identified nicotine-related improved performance on vigilance and rapid information processing tasks, including tasks that may be relevant to some soldier tasks. It also showed a constellation of negative behaviors that are correlated with smoking such as drug abuse, delinquency, and driving accidents.

COMMENTS: *This extensive (223 page) literature review contains a thorough review of the literature as of 1986, and is also a good source of information on tobacco's effects on the endocrine system. The report discusses the many effects of smoking on physical work capacity and endurance, perceptual processes, vigilance, rapid information processing, divided attention, cognitive processes, arousal and ability to deal with stress, pain, and fear. Other topics discussed include the position disclosure in combat due to smoking and tobacco-seeking behavior; the effects of tobacco deprivation; smoking-disease relationships; smoking, abuse of other substances, delinquency, and driving accidents; smoking-induced hormonal changes; associations between smoking and other factors of potential relevance to*

soldier performance; and the need for additional research on smoking and soldier performance. (PJA)

91. Eiser, J.R., Sutton, S.R. and Woher, M. Smoking, seat-belts, and beliefs about health. Addict Behav 4(4):331-8, 1979.

ABSTRACT: Questionnaires concerned with cigarette smoking and seat-belt use were completed by 378 respondents who were taking part in a survey of audience reactions to 1 week's television programs. Controlling for sex, age, and social class, self-reported seat-belt use was lower among smokers than non-smokers ($P<0.01$). Smokers tended to hold less negative beliefs about the consequences of smoking than did non-smokers. Notably, only 49.5% of smokers (as against 88.7% of never-smokers) believed smoking to be "really as dangerous as people say", and 13.8% of smokers (as against 29.2% of never-smokers) realized that smoking caused more deaths than road accidents. Similarly, non-wearers of seat belts were more skeptical of the benefits of seat-belt use (51.6% of non-wearers believed "seat belts really make driving much safer" compared with 92.2% of wearers). Respondents who asserted that people have the right to put their own health at risk, as opposed to a moral responsibility not to risk their health, were more likely to smoke and less likely to wear seat-belts. It is concluded that both smoking and the non-use of seat-belts may partly reflect more general attitudes about safeguarding health as well as more specific beliefs which may be susceptible to informational influence.

92. Eklund, S.A. and Burt, B.A. Risk factors for total tooth loss in the United States; longitudinal analysis of national data. J Public Health Dent 54(1):5-14, 1994.

ABSTRACT: The NHANES I Epidemiologic Follow-up Study (NHEFS) of 1982-84 collected longitudinal data from 10,523 individuals initially seen during the first National Health and Nutrition Examination Survey (NHANES I) of 1971-75. Among this additional data was information on the incidence of total tooth loss during the 10 years between the surveys, which could then be added to NHANES I data to identify risk factors. In this analysis, a series of bivariate analyses were carried out, followed by logistic regression analysis to assess the simultaneous effect of major variables. Results showed that 7.4 percent of dentate Americans aged 25-74 at NHANES I became edentulous over the next 10 years. In bivariate analyses, the incidence of edentulism was correlated with baseline measures of lower income and education status, poorer oral health, self-perceptions of poor general health and oral health, absence of a regular dentist, and a lower number of remaining teeth at baseline. No correlation was found with gender and geographic region, nor with self-reported diabetes and arthritis, and age was not a factor when the number of remaining teeth at baseline were taken into account. In a logistic regression model assessing the effect of these variables simultaneously, none of the demographic variables retained significance; the only variable statistically significant in both age groups was the number of teeth remaining at baseline. Other significant variables in younger persons were higher periodontal disease scores, perceived poor dental health, perceived need for extractions, history of smoking, and low ascorbic acid intake. Some of these variables were reflections of negative health behavior and attitudes rather than direct correlates. Principal findings from this study were the importance of early tooth loss in eventual edentulism and the virtual disappearance of gender and age as determinants of total tooth loss.

93. Ellinghouse, C. The Effects of Cigarette Smoking on Memory and Attention. Thesis, Psychology Dept., Washington College, Chestertown, MD, 47, 1983.

ABSTRACT: Current psychological research has provided us with evidence that cigarette smoking has a detrimental effect upon memory and attention. In this experiment the performance of the two groups of 15 subjects was measured across three tasks: a Memory Assessment task, a Reading comprehension Task, and an Attentional Task. One group of non-smokers acted as the control. The other group made up of habitual smokers was tested under two conditions: smoking and non-smoking. The results indicated that the long term and the immediate effects of smoking significantly decreased free recall of information.

Smokers also tended to recall less low level or insignificant information than did non-smokers. The results also indicated that the long term effects of smoking decrease attentional capabilities as measured by reaction time.

94. Ernster, V.L., Grady, D., Milke, R., et al. Facial wrinkling in men and women, by smoking status. Am J Public Health 85(1):78-82, 1995.

ABSTRACT: Objectives. This study examined the association of smoking status and pack-years of smoking with facial wrinkling in men and women. Methods. We conducted a cross-sectional study of 299 never smokers, 551 former smokers and 286 current smokers, aged 30 through 69 years, drawn from a health maintenance organization. Smoking status, pack-years of smoking, and potential confounding variables were assessed by questionnaire. Facial wrinkling category, a dichotomous variable, and facial wrinkle score, a computed continuous variable, were assessed by blinded standardized visual assessment. Wrinkling was so uncommon among 30- through 39-year-old subjects that analyses were restricted to subjects aged 40 and over (277 never smokers, 456 former smokers, and 228 current smokers). Results. With age, average sun exposure, and body mass index controlled, the estimated relative risk of moderate/severe wrinkling for current smokers compared to never smokers was 2.3 (95% confidence interval [CI] = 1.2, 4.2) among men and 3.1 (95% CI = 1.6, 5.9) among women. Pack-years was positively associated with facial wrinkle score in women aged 40 through 69 years and in men aged 40 through 59 years. In both groups, the increased risk of wrinkling was equivalent to about 1.4 years of aging. Conclusions. Our results support earlier findings that risk of facial wrinkling is greater in cigarette smokers than in never smokers.

COMMENTS: *The authors report that smoking increases facial wrinkling two to three fold among smokers. They hypothesize that this could be due to topical drying effect of smoke on the skin, or systemic effects on vascular or connective tissue of the skin. Cigarette smoke acutely decreases arteriolar blood flow in the skin, perhaps causing chronic ischemia of the dermis. In the lungs, cigarette smoke damages collagen and elastin, tissue elements important to maintaining the integrity of the skin. Smoking may decrease levels of vitamin A, which may provide protection against oxygen radicals that damage DNA and connective tissue. This could also be the mechanism of compromised tissue repair that makes smokers at greater risk of overuse injuries. (PJA)*

95. Fagerstrom, K.O. and Gotestam, K.G. Increase of muscle tonus after tobacco smoking. Addict Behav 2(4):203-6, 1977.

96. Falkenbach, A. [Primary prevention of osteopenia]. Schweiz Med Wochenschr 122(45):1728-35, 1992.

ABSTRACT: In industrialized countries the clinical and socioeconomic importance of osteoporosis has been well recognized in recent years. Various treatments have been introduced for secondary prevention in established osteoporosis. There is, however, a deficit in the primary prevention of osteopenia. In every age group physical exercise stimulates mineralization of the bone. With regular training adolescents can achieve a higher peak bone mass. In old age the physiologic decrease of bone mass can be retarded by physical exercise. A diet rich in calcium has positive effects on mineralization of the bone. Estrogens have proved efficacious in the prevention of osteoporosis in postmenopausal women. Abstinence from nicotine and alcohol contributes to the prevention of osteopenia.

97. Farmer, M.E., Harris, T., Madans, J.H., et al. Anthropometric indicators and hip fracture. The NHANES I epidemiologic follow-up study. J Am Geriatr Soc 37(1):9-16, 1989.

ABSTRACT: A cohort of 3,595 white women aged 40-77 years was followed for an average of 10 years during which 84 new cases of hip fracture were identified. Triceps skinfold thickness and arm muscle area measured at baseline were examined as possible risk factors for hip fracture controlling for physical activity, height, menopausal status, calcium consumption, and smoking. Of these variables only arm muscle area, triceps skinfold thickness, and activity in recreation were independent predictors of hip fracture incidence using the Cox proportional hazards model. After adjustment, the estimated relative risk of hip fracture was approximately two for an increment of each anthropometric indicator (adjusted for the other) equivalent to comparing those at the 25th percentile to those at the 75th percentile (maximum width of 95% confidence intervals, 1.2-2.9). Risk of hip fracture was approximately two-fold for persons who reported little recreational exercise compared to persons who reported much recreational exercise (95% confidence interval, 1.2-3.2). Our findings are the first evidence from a prospective study that anthropometric indicators besides body mass index may have an independent relationship to risk of hip fracture.

98. Felson, D.T., Kiel, D.P., Anderson, J.J. and Kannel, W.B. Alcohol consumption and hip fractures: the Framingham Study. Am J Epidemiol 128(5):1102-10, 1988.

ABSTRACT: Alcoholics often sustain hip and other fractures. However, a detailed examination of the association between alcohol consumption and hip fractures has not been undertaken. Specifically, the effects of moderate alcohol intake, of alcohol consumption in the elderly, and of changes in consumption have not been studied. Using a retrospective cohort design, the authors evaluated this association in the population-based Framingham Heart Study cohort, a group studied over 35 years and queried repeatedly about their alcohol consumption. In 117,224 person-years of observation, 217 hip fractures occurred. Heavy current alcohol consumption (defined as seven or more ounces (207 ml or more) per week) was associated with a modestly increased risk of hip fracture for women (relative risk (RR) = 1.54) and for men (RR = 1.26) after adjustment for age. In a logistic regression analysis controlling for age, sex, weight, and smoking, current alcohol consumption was associated with a significant ($p = 0.01$) increase in risk of fracture. The relative risks at different ages were not uniform. For those aged less than 65 years, moderate (2-6 ounces (59.14-177.4 ml) per week) and heavy (seven or more ounces (207 ml or more) per week) were associated with a substantial and significant increased risk, but there was only a marginal and nonsignificant increase in risk in those aged 65 years or more. Examination of the effect of changing alcohol consumption over time indicated that among present heavy alcohol users, past light alcohol consumption reduced the risk ($p = 0.03$) of fracture, whereas in those with present light consumption, past heavy intake had little effect on fracture risk ($p = \text{nonsignificant}$). In conclusion, alcohol consumption, especially if long-term and heavy, increases the risk of hip fracture.

99. Felson, D.T., Anderson, J.J., Naimark, A., et al. Does smoking protect against osteoarthritis? Arthritis Rheum 32(2):166-72, 1989.

ABSTRACT: While studying knee osteoarthritis (OA) in the first Health and Nutrition Examination Survey, we unexpectedly found a protective association between smoking and OA. After adjustment for age, sex, and weight, smokers had a significantly lower rate of OA than did non-smokers, and heavier smokers were less likely to have the disease than were light smokers. To test this association in a separate study and see if it was due to confounding factors, we looked at the Framingham Osteoarthritis Study, a study of elderly members of the Framingham Heart Study cohort. We evaluated whether the presence of knee OA in 1983-1985 was related to smoking status at the first Framingham examination, 36 years earlier. Subjects who had been smokers at examination 1 had a lower rate of OA (190 of 679, 28%) than did non-smokers (276 of 736, 37.5%). In an analysis adjusted for age, sex, and weight, heavy smokers had a modestly lower risk of developing knee OA than did non-smokers (relative risk 0.81). Also, the adjusted risk of severe OA was less in heavy smokers than in non-smokers (relative risk 0.73). The negative association with OA persisted when we examined the average cigarette consumption over the first 10 years of the Framingham study. Furthermore, after controlling for age, sex, weight, knee injury history, sports activity history, physical activity level, coffee and alcohol consumption, and weight change after examination 1,

and after modeling weight and age in a nonlinear manner, smoking remained a significant protector against later knee OA. It appears that smoking or some unidentified factor correlated with smoking modestly protects against the development of knee OA.

100. Felson, D.T., Zhang, Y., Anthony, J.M., Naimark, A. and Anderson, J.J. Weight loss reduces the risk for symptomatic knee osteoarthritis in women. The Framingham Study [see comments]. Ann Intern Med 116(7):535-9, 1992.

ABSTRACT: OBJECTIVE: To evaluate the effect of weight loss in preventing symptomatic knee osteoarthritis in women. DESIGN: Cohort analytic study. SETTING: The Framingham Study, based on a sample of a defined population. PATIENTS: Women who participated in the Framingham Knee Osteoarthritis Study (1983 to 1985): Sixty-four out of 796 women studied had recent-onset symptomatic knee osteoarthritis (knee symptoms plus radiographically confirmed osteoarthritis) were compared with women without disease. MEASUREMENTS: Recalled date of symptom onset was used as the incident date of disease. Historical weight was defined as baseline body mass index up to 12 years before symptom onset. Change in body mass index was assessed at several intervals before the current examination. Odds ratios assessing the association between weight change and knee osteoarthritis were adjusted for age, baseline body mass index, history of previous knee injury, habitual physical activity level, occupational physical labor, smoking status, and attained education. RESULTS: Weight change significantly affected the risk for the development of knee osteoarthritis. For example, a decrease in body mass index of 2 units or more (weight loss, approximately 5.1 kg) over the 10 years before the current examination decreased the odds for developing osteoarthritis by over 50% (odds ratio, 0.46; 95% CI, 0.24 to 0.86; $P = 0.02$). Among those women with a high risk for osteoarthritis due to elevated baseline body mass index (greater than or equal to 25), weight loss also decreased the risk (for 2 units of body mass index, odds ratio, 0.41; $P = 0.02$). Weight gain was associated with a slightly increased risk for osteoarthritis, which was not statistically significant. CONCLUSION: Weight loss reduces the risk for symptomatic knee osteoarthritis in women.

101. Fernandez, K.H., Tamarin, F.M. and Brandstetter, R.D. A "pack of trouble" for smoking drivers. NY State J of Med March:184-6, 1987.

COMMENTS: *This letter to the editor was written in response to the article "The relationship of smoking to motor vehicle accidents and traffic violations," DiFranza et al. NY State J Med; 86:464-467, 1986. The authors express concern that bias may have accounted for DiFranza's findings of increased risk of motor vehicle accidents. They objected to the use of a group of drivers with only "minor infractions" while excluding drunken driver violators. DiFranza et al. also did not know if the drivers were smoking at the time of their infractions. They point out the importance of some of these factors in looking at the question of whether personality vs. some destructive or physiological problem was the cause of the findings. Night accident rates were also not specifically analyzed and may have been illustrative given the known effects of carbon monoxide on night vision. Professional bus drivers were suggested as a group with potential for further study. Perhaps military pilots would be an even better group. (PJA)*

102. Fine, B.J. and Kobrick, J.L. Cigarette smoking, field-dependence and contrast sensitivity. Aviat Space Environ Med 58(8):777-82, 1987.

ABSTRACT: This study examined the separate and combined effects of cigarette smoking and field-dependence on contrast sensitivity. No previous research on these relationships exists; however, all three variables are known to be significantly related to many aspects of human performance. Under carefully controlled conditions, 12 smokers and 16 non-smokers were tested for field-dependence and measured for contrast sensitivity (Nicolet CS 2000 Testing System). No differences in contrast sensitivity of smokers were found when measured immediately after smoking 1 cigarette, as compared with having

been deprived of smoking for at least 90 min. Habitual smoking and field-dependence were found to be separately and interactively related to contrast sensitivity. A field-independent non-smoker group performed significantly better than a field-dependent smoker group at all but the lowest spatial frequency. The results have important implications for many types of performance, particularly aircraft and motor vehicle operation, and may be valuable for use in selection and training.

COMMENTS: *This USARIEM study found smokers in either the deprived state or non-deprived state to exhibit poorer contrast sensitivity when compared to non-smokers. The implications of this finding for pilots and drivers were discussed. A direct mechanism for increasing risk of motor vehicle or aviation accidents can be postulated based on these results and is worthy of further investigation. (PJA)*

103. Foullds, J. Detrimental effects of nicotine on mood? Addiction 89:136-8, 1994.

104. Friberg, L., Cederlof, R., Lundman, T. and Olsson, H. Mortality in smoking discordant monozygotic and dizygotic twins. A study on the Swedish Twin Registry. Arch Environ Health 21(4):508-13, 1970.

ABSTRACT: Among 706, male, dizygotic, smoking discordant twin pairs born in 1901 to 1925, 13 deaths occurred among non-smokers or less exposed partners against 34 among smokers or more exposed. In 246 corresponding monozygotic pairs the figures were 14 against 9. The excess mortality among male dizygotic smokers was not associated with any specific cause of death. Four cases of lung cancer among males occurred only in smokers. Accidents and suicides seemed to be associated with smoking, supporting the hypotheses regarding differences in personality type between smokers and non-smokers. Only time will show whether trends found are stable. The data suggest, however, that part of the greater mortality in smokers is not due to smoking per se but to factors associated with smoking.

COMMENTS: *Among dizygotic male and female twin pairs there were 4 suicide deaths among smokers and none among non-smokers. Among monozygotic male and female twin pairs, there were no suicide deaths. Among dizygotic male and female twin pairs there were 6 accident deaths among smokers and 1 among non-smokers. Among monozygotic male and female twin pairs there were 2 accident deaths among smokers and 2 among non-smokers. (PJA)*

105. Friberg, L., Cederlof, R., Lorich, U., Lundman, T. and De Faire, U. Mortality in twins in relation to smoking habits and alcohol problems. Arch Environ Health 27(5):294-304, 1973.

ABSTRACT: Results are presented from an 11-year study on 9,000 pairs. On a non-pair basis, a significant hypermortality was related to smoking in men and women. Among 706 male dizygotic smoking discordant pairs born 1901 to 1925, 55 deaths or "first deaths" occurred in a high smoking group, against 31 in a low smoking group. Among 246 corresponding monozygotic male pairs, the numbers were 18 vs 18. For women, the numbers were 42 vs 31 among 781 dizygotic pairs, and 14 vs 13 among 326 monozygotic pairs. The hypermortality was mainly due to coronary heart disease, lung cancer, suicides, and accidents. Non-smokers were registered at 10% in a nationwide "alcohol registry" as against 30% for high smokers. The mortality among the registered subjects was significantly higher than among the nonregistered, regardless of smoking. Data imply that part of the hypermortality among smokers is not due to smoking per se, but to factors associated with smoking.

COMMENTS: *The authors report age adjusted suicide death rates among women of 0.1% for non-smokers, 0.3% for smokers of 1-10 cigarettes per day, and 1.2% for smokers >10 cigarettes per day. The reported age adjusted accident death rates of 0.2% for non-smokers, 0.2% for smokers of 1-10 cigarettes per day, and 0.3% for smokers >10 cigarettes per day. While the authors dismiss the possibility that the*

excess deaths in the smokers could be due to a primary effect of tobacco, they do not adequately defend this point. Pooled data of mono and dizygotes, men and women, reveal clear excess mortality from accidents and suicides among smokers. (PJA)

106. Friedl, K.E., Nuovo, J.A., Patience, T.H. and Dettori, J.R. Risk Factors for Osteoporosis are Associated with Stress Fracture in Young Women. Natick, MA: U. S. Army Research Institute of Environmental Medicine, Technical Report #AD-A212 143, 1989.

ABSTRACT: Several factors which affect bone density and predict risk of osteoporosis have been reportedly associated with a higher incidence of stress fracture in young active women (e.g. amenorrhea, ethnic origin). This study surveyed the prevalence of ever having been diagnosed with a stress fracture in a large population of healthy premenopausal women and examined the association with risk factors for osteoporosis. A mail survey was delivered to 2312 active duty Army women (mean age: 26.1 + or - 5.8 (SD) yrs) and questionnaires were returned by 70.5% (1630) of this sample. Stress fracture had been previously diagnosed in 16.1% (263) of the respondents. Current smoking, previous history of amenorrhea (menses absent > 6 months) and known family history of osteoporosis were associated with history of stress fracture, while black ethnic origin appears to have been a protective factor. Age was inversely associated with stress fracture, probably reflecting selective processes specific to this population. These data suggests hypotheses for stress fracture risk factors which bear further testing.

107. Friedl, K.E., Nuovo, J.A., Patience, T.H. and Dettori, J.R. Factors associated with stress fracture in young Army women: indications for further research. Mil Med 157(7):334-8, 1992.

ABSTRACT: Several factors which affect bone density and predict risk of osteoporosis (e.g., ethnic origin, amenorrhea) are reportedly associated with a higher incidence of stress fractures in active premenopausal women. The authors surveyed 2,312 active duty Army women for the prevalence of ever having been diagnosed ("told by a doctor") with a stress fracture (16.1% of respondents) and examined the relationship between surveyable risk factors for low bone density and this self-reported stress fracture history (self-reported SF). Current smoking, previous history of amenorrhea (menses absent > 6 months), and known family history of osteoporosis were significantly associated with self-reported SF, while black ethnic origin was a protective factor. These data suggest hypotheses of stress fracture pathogenesis in Army women which bear further testing.

COMMENTS: *In this study, Army women <25 years who smoked, had an odds ratio for stress fracture = 1.96. Women > 25 years old had an odds ratio of 1.84 (Pooled odds ratio and 95% CI = 1.91 (1.45-2.51). (PJA)*

108. Friedman, A.J., Ravnikar, V.A. and Barbieri, R.L. Serum steroid hormone profiles in postmenopausal smokers and non-smokers. Fertil Steril 47(3):398-401, 1987.

ABSTRACT: Morning serum steroid levels were determined in postmenopausal chronic smokers and non-smokers. Postmenopausal smokers ($n = 9$) had significantly elevated levels of cortisol, progesterone (P), 17-hydroxyprogesterone (17-OHP), androstenedione, and testosterone compared with non-smokers ($n = 16$). The increases were most significant for cortisol (P less than 0.001) and 17-OHP (P less than 0.0005). Estrone, estradiol, dihydrotestosterone, and dehydroepiandrosterone sulfate did not differ between the groups. P to estrogen ratios tended to be higher in the smoking population. The significantly elevated P levels observed in the group of postmenopausal smokers may explain, in part, the epidemiologic finding that women smokers have a decreased incidence of endometrial carcinoma. In addition, the hypercortisolism associated with smoking may increase the risk of osteoporosis.

109. Fries, J.F., Koop, C.E., Beadle, C.E., et al. Reducing health care costs by reducing the need and demand for medical services. The Health Project Consortium [see comments]. N Engl J Med 329(5):321-5, 1993.

110. Frymoyer, J.W., Malcolm, P.H., Costanza, M.C., et al. Epidemiologic studies of low-back pain. Spine 5(5):419-423, 1980.

ABSTRACT: The records of 3920 patients (2068 females, 1852 males) entering a model family practice unit between 1975 and 1978 have been analyzed. Eleven percent of males and 9.5% of females reported an episode of low-back pain during that 3-year interval. The complaint of medically reported low-back pain was significantly related to occupational factors such as truck driving ($P<0.001$), lifting, carrying, pulling, pushing, and twisting ($P<0.001$ for all variables) as well as nondriving vibrational exposure ($P<0.001$). Patients reporting low-back pain also reported more episodes of anxiety ($P<0.001$) and depression ($P<0.001$) and had more emotionally stressful occupations ($P<0.001$). The mean number of pregnancies was greater in women with low-back pain (2.6) than in those without (1.6) ($P<0.001$). The low-back pain sufferers were more likely to be cigarette smokers ($P<0.001$). This population is currently under prospective study to define the relevance of each of these risk factors to the complaint of low-back pain.

COMMENT: This study examined 3920 patients at a family practice to assess the incidence of low-back pain that was sufficient enough to require medical consultation. Eleven percent of males and 9.5% of females had low back pain during the study period. Results showed that among men with low back pain 33.0% were smokers compared to 13.6% among men without low back pain. Similarly, for women with low back pain 26.0% were smokers while among women without low back pain only 12.1% were smokers. Several possible mechanisms are suggested to explain the relationship between smoking and low back pain. First, it is possible that smokers have emotional traits that make them more likely to complain of low back pain. A second hypothesis is that smoking produces certain hormonal or other changes which increase low back pain. A third hypothesis is that smokers have a greater incidence of chronic cough which may place additional mechanical stress on the low back. (JAB)

111. Frymoyer, J.W., Pope, M.H., Clements, J.H., et al. Risk factors in low-back pain. J Bone Joint Surg 65-A(2):213-18, 1983.

ABSTRACT: A survey was done on 1221 men between the ages of eighteen and fifty-five years who had been seen in a family-practice facility between 1975 and 1978. Each patient completed a questionnaire concerning any history of low-back pain, associated symptoms in the lower limbs, resultant disability, types of health care utilized, certain occupational characteristics, exposure to vehicular vibration, and sports activities. We found that 368 patients (30.1 per cent) had never experienced low-back pain, 565 (46.3 per cent) had or were having moderate low-back pain, and 288 (23.6 per cent) had or were having severe low-back pain. Patients with severe low-back pain had significantly more complaints in the lower limbs, sought more medical care and treatment for the low-back pain, and had lost more time from work for this reason. Risk factors associated with severe low-back pain included jobs requiring repetitive lifting, the use of jackhammers or machine tools, and the operation of motor vehicles. Patients with severe pain were more likely to be cigarette-smokers and had a greater tobacco consumption as measured by both the number of cigarettes smoked per day and the number of years of exposure. Patients with moderate low-back pain were more often joggers and cross-country skiers when compared with the asymptomatic men and the men with severe low-back pain. Otherwise, there were no identifiable differences related to sports activity.

112. Fulghum, J.E., Williams, B. and Snowden, R. Smoking and accidents. J Fla Med

Assoc 54(3):261-3, 1967.

113. Giladi, M.C. Stress fractures. Identifiable risk factors. Am J Sports Med 19(6):647-652, 1991.

ABSTRACT: To answer the question why such large differences in stress fracture morbidity rates (2% to 64%) exist in different countries, we prospectively evaluated 312 recruits for possible risk factors for stress fractures. Prior to training, each recruit underwent an evaluation including the following: orthopedic examination, foot and tibial radiographs, measurements of tibial bone width, bone mineral content, bone density, aerobic physical fitness and leg power, assessments of somatotype and smoking habits, and evaluation of sociological and psychological factors. Using a multivariate analysis, two risk factors were identified: recruits with stress fractures had significantly narrower tibiae (P less than 0.001), and a higher degree of external rotation of the hip (P = 0.016). These two variables were independent and cumulative. Stress fracture morbidity was 17%, 29%, and 45% when neither, one, or both risk factors were present respectively (P less than 0.001). Identification of these risk factors might explain the susceptibility of some people to stress fractures.

114. Glick, S.M. Preventive medicine in geriatrics. Med Clin North Am 60(6):1325-32, 1976.

115. Gold, M.S. Tobacco. Plenum Medical Book Company, New York and London, 1995.

COMMENTS: *This excellent volume covers a broad range of topics related to tobacco use but does not cover musculoskeletal injury. The writing is clear and concise. Topics covered include history and politics of the tobacco industry, the economics of tobacco, neurobiological effects, tobacco associated morbidity and mortality, psychiatric aspects of tobacco use, and treatment challenges and recommendations for clinicians. Additional sources and references are also amply provided. (PJA)*

116. Gonzalez, E.J., Rodriguez, A.F., Martin, M.J., Banegas, R. and Villar, A.F. [Deaths attributable to tobacco consumption in Spain]. Med Clin (Barc) 92(1):15-8, 1989.

ABSTRACT: Spain is one of the European countries with greater prevalence of tobacco consumption among general population. In order to encourage the implementation of tobacco consumption reduction programs, the number of deaths caused by cardiovascular diseases and chief cancer localizations attributable to tobacco consumption in Spain were calculated by epidemiologic methods. Estimates suggest that, in 1983, 39.816 tobacco related deaths occurred, which accounted for 13% of total deaths reported during that year. The four tobacco related diseases producing the greatest number of deaths were ischemic cardiopathy (10.821 deaths), bronchopulmonary cancer (8.337 deaths), chronic obstructive pulmonary disease (7.473 deaths), and acute cerebrovascular accident (6.636 deaths). These results suggest that tobacco consumption is the isolated cause responsible of the greatest number of deaths in Spain, whose control must become a priority objective in our health policy.

117. Gora, M.L. Nicotine transdermal systems. Ann Pharmacother 27(6):742-50, 1993.

ABSTRACT: OBJECTIVE: To review the role of transdermal nicotine as an aid to smoking cessation. DATA SOURCES: A MEDLINE search was performed that included clinical studies published in English involving transdermal nicotine; references used in those articles were screened for additional published information. STUDY SELECTION: Published clinical trials were reviewed with particular emphasis on

controlled trials that evaluated safety and efficacy. DATA SYNTHESIS: Transdermal nicotine therapy has been shown to be a safe and effective pharmacologic aid in a smoking cessation program when used in conjunction with a psychological or behavior support system. Habitrol, Nicoderm, Nicotrol, and PROSTEP differ in some characteristics (i.e., delivery systems, total nicotine content and amount absorbed, rate of delivery, recommended duration of application); however, the clinical implication of these differences has not been determined. CONCLUSIONS: Transdermal nicotine is effective for patients who are motivated to quit smoking and receive concomitant behavior support.

118. Gourlay, S., Forbes, A., Marriner, T., Kutin, J. and McNeil, J. A placebo-controlled study of three clonidine doses for smoking cessation. *Clin Pharmacol Ther* 55(1):64-9, 1994.

ABSTRACT: BACKGROUND AND OBJECTIVE: Clonidine in doses of 150 to 450 micrograms per day has been reported to reduce symptoms of craving associated with tobacco withdrawal and, in some cases, to improve long-term abstinence rates of smoking cessation programs. However, subjects frequently experienced symptoms of dry mouth and drowsiness. This study investigated the lower end of the effective dose range of clonidine for smoking cessation to identify the lowest useful dose and thus minimize the adverse effects of the drug. METHODS: A randomized, double-blind, four-way crossover design compared the effects of clonidine doses or placebo within individual subjects for 4 consecutive weeks. Smokers who were highly nicotine dependent were randomly assigned to different sequences of placebo and 300, 200, and 100 micrograms clonidine per day. Subjects were treated for 4 days of each treatment week and began smoking cessation from the end of day 2. Smokers recorded withdrawal symptoms on multiple visual analog scales during days 3 and 4 before resuming normal smoking until the next period of smoking cessation. RESULTS: A statistically significant dose-response effect was found for craving scores (dose-response gradient, -3.8/100 micrograms; 95% confidence interval [CI], -6.2 to -1.5; $p = 0.002$) but not for pooled tobacco withdrawal scores. The dose of 300 micrograms per day reduced mean craving scores significantly (-16%; 95% CI, -31% to -1%). Dosing with 200 micrograms approached statistical significance (-14%; 95% CI, -30% to 1%) but dosing with 100 micrograms did not (-6%; 95% CI, -22% to 9%). Troublesome adverse experiences were reported by more than 67% of subjects during 200 and 300 micrograms dosing. CONCLUSIONS: This study showed a statistically significant dose-response effect of clonidine on tobacco withdrawal craving and a reduction in mean craving scores of 16% during 300 micrograms dosing. However, its clinical usefulness is doubtful because of frequently reported adverse experiences.

119. Gourlay, S. The pros and cons of transdermal nicotine therapy [see comments]. *Med J Aust* 160(3):152-9, 1994.

ABSTRACT: OBJECTIVE: To review current knowledge of the efficacy, safety and cost of transdermal nicotine therapy for smoking cessation. DATA SOURCES AND STUDY SELECTION: 1. Published and unpublished reports of randomized, double-blind trials of at least 12 weeks' duration, in smokers motivated to cease smoking, identified by a search of the MEDLINE database, article and book bibliographies, Current contents, and by a request to the Medical Department of Ciba-Geigy (Australia) Ltd. 2. A clinical trial of 1500 smokers using transdermal nicotine (S Gourlay, unpublished data). DATA SYNTHESIS: Transdermal nicotine more than doubles the success rates of smoking cessation attempts in motivated subjects who smoke at least 10-15 cigarettes per day (odds ratio 12 months after quitting, 2.3; 95% confidence interval, 1.6-3.4). Application site reactions are not uncommon (erythema or burning < or = 16%, transient itch < or = 50%) and cause discontinuation of therapy in up to 10% of subjects. Sleep disturbance due to nocturnal nicotine absorption occurs in up to 13% of subjects when patches are worn overnight. Smoking or nicotine chewing gum used concurrently with transdermal nicotine could raise peak nicotine levels but is unlikely to adversely affect individuals with established tolerance to nicotine. Smoking and (theoretically) nicotine replacement therapies should be avoided in pregnancy or patients

with unstable coronary artery disease. In such patients, the risk-benefit ratio of nicotine replacement therapies may be favorable for nicotine-dependent smokers unable to cease smoking by alternative methods. CONCLUSIONS: Transdermal nicotine is an effective smoking cessation therapy for motivated, nicotine-dependent smokers. As most smokers can cease smoking on their own, and the patches are costly, they should be recommended only for smokers who are unable to quit by simpler means and those likely to suffer severe nicotine withdrawal symptoms.

120. Graham, J.D. and Hitchens, R.A. Trends in hospitalized accidental poisoning. *Dr J Prev Soc Med* 22(1):55-58, 1968.

121. Grandjean, P., Nielsen, G.D., Jorgensen, P.J. and Horder, M. Reference intervals for trace elements in blood: significance of risk factors. *Scand J Clin Lab Invest* 52(4):321-37, 1992.

ABSTRACT: A random sample of 100 men and 100 women was examined for whole-blood concentrations of mercury, lead, cadmium and selenium, and the serum concentrations of selenium, nickel, fluoride, aluminum, zinc and copper. Major predictors were sex, hormonal factors (pregnancy, menopause, use of oral contraceptives), age, tobacco smoking and alcohol drinking. Among notable associations, increased blood-mercury was related to the presence of more than four amalgam fillings in the teeth. Blood-mercury correlated with blood-selenium, but a relation to fish intake could only be demonstrated for the former parameter. In women, blood-lead appeared to increase with age, with the highest levels seen after the menopause. Serum-nickel was slightly lower in patients with nickel-related contact eczema. Only the selenium concentrations showed a slight increase in individuals taking mineral supplements. Serum-zinc concentrations decreased considerably during the day. Thus, due to the substantial influence of physiological and environmental factors, individual results must be interpreted in the light of the known predictors for the trace element concentration. However, population-based reference intervals for trace elements in blood are useful to explore geographic and temporal variations.

122. Grandjean, P. International perspectives of lead exposure and lead toxicity. *Neurotoxicology* 14(2-3):9-14, 1993.

ABSTRACT: Three approaches have been used to examine how human body burdens of lead depend on different environments: (1) In paleopathologic studies, lead concentrations have been determined in well-preserved human bones or teeth, and pre-pollution samples generally show lead concentrations of about 1% of current levels in industrialized countries. (2) Geographic comparisons of blood-lead concentrations show low levels in, Nepal, Faroe Islands, and Sweden, while high levels occur in Mexico and Malta; average blood-lead levels may vary by a factor of 10 or more. (3) In analytical epidemiology, major exposure sources have been related to lead levels in blood, by either prospective or cross-sectional design. Increased blood-lead concentrations are related to smoking, drinking alcoholic beverages, eating vegetables for dinner, urban residence, and exposure from lead-using industries; average blood-lead values of subgroups within well-defined populations may vary by a factor of 3 or more. The dose-relationships for lead-induced neurotoxicity will depend on the sensitivity of the parameters chosen as indicators of lead exposure and of neurotoxicity. The temporal relationship between lead exposures and the development of deficits must be ascertained. Individual susceptibility and interacting factors must also be taken into account. Differences in addressing these issues impede the comparison between studies. Recently neonatal jaundice has been found to be a risk factor for subsequent neurobehavioral dysfunction in children with a birth weight above 2500 g, but only in children with increased lead exposure. Lead exposure may act in combination with several other factors and result in additive, or synergistic effects.(ABSTRACT TRUNCATED AT 250 WORDS)

COMMENTS: *Smoking is associated with increased blood levels of lead. This is a potential cause for a*

variety of the injury mechanisms considered here since lead has effects on so many systems. (PJA)

123. Green, M.S., Luz, J. and Gofer, D. Absence from work among smokers and non-smokers in Israeli industries -- the Cordis Study. Isr J Med Sci 28(8-9):645-9, 1992.

ABSTRACT: While the negative economic effects of cigarette smoking are frequently examined in terms of the costs of health services and potential years of life lost, data on the indirect costs due to absence from work in Israel are scarce. During 1985-87, cigarette smoking habits and absence due to illness and accidents were examined in 5,826 employees (4,177 men and 1,649 women) in Israeli industry, screened in the framework of the Cordis Study. The absenteeism data related to the period 1986-87. Among men, smokers were absent an average of 2.6 days per employee more than non-smokers ($P < 0.001$) over the 2-year period after adjusting for age and occupational category. Among women there was no significant difference in sickness absenteeism between smokers and non-smokers. The excess days lost among male smokers was only partly explained by increased absence due to respiratory illness. Accident rates did not differ by smoking habits. There is a significant increase in absence due to illness among men employed in Israeli industry, which may be attributed to cigarette smoking. Since cigarette smoking continues to be a common practice, the overall costs to the economy may be considerable.

124. Grisso, J.A., Chiu, G.Y., Maislin, G., Steinmann, W.C. and Portale, J. Risk factors for hip fractures in men: A preliminary study. J Bone and Mineral Res 6(8):865-8, 1991.

ABSTRACT: Although hip fracture rates are higher in women than in men, for older men the lifetime risk of fractures of the femur is substantial. Very little is known about risk factors for hip fracture in men. A preliminary case control study was conducted comparing the medical charts of men with first hip fractures with two sets of age-matched controls. The major risk factors for hip fracture that emerged were preadmission ambulatory problems, confusion, heavy alcohol use, and low body mass. Although this study is limited to a medical chart review in a veteran population, these results confirm some of the known associations for hip fracture in women. Further studies in men are recommended.

125. Gritz, E.R., Baer-Weiss, V., Benowitz, N.L., Van Vunakis, H. and Jarvik, M.E. Plasma nicotine and cotinine concentrations in habitual smokeless tobacco users. Clin Pharmacol Ther 30(2):201-9, 1981.

ABSTRACT: Plasma nicotine and cotinine levels were measured in habitual users of smokeless tobacco. The subjects were 12 male college students who regularly used smokeless tobacco (11 dipped snuff and one chewed tobacco) and did not smoke cigarettes. Subjects abstained from tobacco use overnight and blood was drawn at 8 A.M. and again after a single day of ad libitum consumption of their own tobacco product. Subjects recorded the times at which tobacco was used and the remainder product was weighed. Plasma samples were analyzed by both gas-liquid chromatography (GLC) and radioimmunoassay (RIA) techniques. Subjects consumed about one third of a can of moist ground snuff (10.8 gm) in eight dips spaced throughout the day. Nicotine absorption was observed and an increase in mean plasma concentration from 2.9 ng/ml after overnight abstinence to 21.6 ng/ml after 6 to 8 hr ad libitum consumption was recorded. Plasma cotinine concentrations rose from a morning mean of 137.3 ng/ml to an afternoon mean of 197.2 ng/ml, concentrations that are typical of those reached in regular cigarette smokers. Subjects fell into two subgroups by post hoc analysis: two-thirds absorbed substantial amounts of nicotine and one-third appeared to have almost no absorption. Subjective effects of tobacco use were not marked; there was little perception of physiologic changes, stimulation, or feelings of relaxation/satisfaction. Results are discussed in terms of pharmacologic effects, comparison of results from GLC and RIA methodologies, and implications for health behaviors.

126. Gross, T.M., Jarvik, M.E. and Rosenblatt, M.R. Nicotine abstinence produces content-specific Stroop interference. Psychopharmacology (Berl) 110(3):333-6, 1993.

ABSTRACT: Adult, male smokers were randomly assigned to be nicotine abstinent for 12 h (n = 10) or to smoke normally for the same period of time (n = 10). Performance on a modified version of the Stroop (1935) color-naming task, where subjects named the color of ink in which each of a series of words was written, showed that abstinent smokers took significantly longer to color-name words related to cigarette smoking (e.g., Lighter) than to color-name neutral control words (e.g., Pennant). Non-abstinent smokers showed a significant difference in the opposite direction. These results suggest that nicotine abstinence decreases the ability to ignore the meaning of smoking-related information. This finding supports the hypothesis that abstinence produces a content-specific shift in attentional focus. The present pattern of results cannot be explained by a general decrease in cognitive function due to nicotine abstinence.

127. Grout, P., Cliff, K.S., Harman, M.L. and Machin, D. Cigarette smoking, road traffic accidents and seat belt usage. Public Health 97(2):95-101, 1983.

ABSTRACT: The association between cigarette smoking and certain diseases found in the general population of England and Wales has been documented, but the possible association between smoking and road traffic accidents has not previously received much serious attention. In a recent case control study during the period February-September 1980 an association was found between the smoking habits of drivers of vehicles involved in injury-producing road traffic accidents and the hours of darkness ($\chi^2 = 9.76$, d.f. = 1, $P < 0.01$), indicating an increased risk of an injury accident during the hours of darkness for drivers who smoke compared to drivers who did not smoke but were also involved in an injury accident. The study also showed a statistically significant association between people who smoked cigarettes and their use of seat belts, ($\chi^2 = 21.86$, d.f. = 1, $P < 0.001$), with smokers less likely to wear seat belts than non-smokers.

COMMENTS: *This excellent article is one of the first to attempt to explain possible etiologies of a smoking-injury relationship. The authors discuss physical, physiological and psychological factors of potential importance. (PJA)*

128. Gu, Y.D., Li, J.F. and Jiang, J.F. Circulatory crisis caused by cigarette smoking in tissue transfer. Clinical and experimental studies. Chin Med J (Engl) 106(9):682-7, 1993.

ABSTRACT: Cigarette smoking-induced circulatory crisis occurred in two patients receiving toe transfer and one patient having musculocutaneous flap. After anticoagulation and antispasm treatment, one survived and two failed. Experimental studies demonstrated that cigarette smoking is harmful to the healing of endothelia at the anastomotic site of vessels. Five days after operation, the complete recovery rate of the endothelium over sutures of anastomotic sites was 16%-19% in smoking groups, but 75% in the control group. The mechanism and characteristics of circulatory crisis caused by cigarette smoking are discussed.

129. Haffner, H.T. and Graw, M. [Cough syncope as a cause of traffic accident]. Blutalkohol 27(2):110-5, 1990.

ABSTRACT: The rare tussive syncope syndrome, which can lead to a road traffic accident, occurs almost solely in the male aged 40 years and over with a pyknic to athletic physique, who suffer from obstructive respiratory tract disease and/or pulmonary emphysema. Frequently there is a correlation between the illness and alcohol and tobacco consumption. Loss of consciousness lasting only a few seconds occurs a few seconds after a coughing attack leaving behind a short loss of memory. Tussive syncope can be a

solitary event, but can also occur up to thirty times a day. In foro, characteristically the link between a heavy coughing and loss of consciousness as well as the type of person make diagnosis easier. The suitability of the subject to hold a driving license should be judged carefully and on individual criteria.

130. Hagberg, M. Occupational musculoskeletal stress and disorders of the neck and shoulder: a review of possible pathophysiology. Int Arch Occup Environ Health 53(3):269-78, 1984.

ABSTRACT: Disorders and complaints in the neck and shoulder regions are common among industrial workers and are often attributed to occupational musculoskeletal stress. The possible pathophysiological mechanism of occupational stress on the neck and shoulders is reviewed. A mechanical origin for cervical disc degeneration and osteoarthritis is reported for a few occupational groups. However, a mechanical origin for osteoarthritis is debatable. A work posture involving elevated arms may accelerate degeneration of shoulder tendons through impairment of circulation due to static tension and humeral compression against the coracoacromial arch. Furthermore, work tasks with repetitive arm movements may evoke shoulder tendinitis or tendo-vaginitis, probably due to friction. Three possible routes to neck-shoulder muscular pain are discussed; mechanical failure, local ischemia and energy metabolism disturbance.

131. Hall, S.M., Munoz, R.F., Reus, V.I. and Sees, K.L. Nicotine, negative affect, and depression. J Consult Clin Psychol 61(5):761-7, 1993.

ABSTRACT: Depression, whether conceptualized as a trait, symptom, or as a diagnosable disorder, is overrepresented among smokers. Depressed smokers appear to experience more withdrawal symptoms on quitting, are less likely to be successful at quitting, and are more likely to relapse. This article documents these relationships and explores several potential links between smoking and depression. The potential efficacy of antidepressant therapy, cognitive-behavioral therapy, and nicotine replacement therapy for smokers with depressive disorders or traits is discussed. Clinical implications and the role of patient treatment matching are also discussed.

COMMENTS: *This article explores some of the comorbid factors of smoking -- especially depression and its importance in smoking cessation efforts. The authors also raise an interesting point: In the past, when smoking was normative, the prevalence of disorders (other than nicotine dependence) among smokers was low. Today, in the face of advanced cessation treatments, widespread anti-smoking programs, and intense social pressures, the characteristics of smokers are changing rapidly. One explanation for the link between smoking and injury is that smoking has no primary involvement at all, but rather is more prevalent among people with some true risk factors -- alcohol use, risk-taking behavior, genetic characteristics, nutrition, etc. If this turns out to be true, one must be very careful when looking at longitudinal data. (PJA)*

132. Hansson, T. and Roos, B. Microcalluses of the trabeculae in lumbar vertebrae and their relation to the bone mineral content. Spine 6(4):375-80, 1981.

ABSTRACT: The bone mineral content of 109 lumbar vertebrae was related to the number of trabecular microcalluses in the vertebral bodies. The appearance and location of the calluses were also investigated. Microcalluses were found in 87 of the vertebral bodies. The incidences of calluses varied in the different groups (31-79 years) between 60 and 90%. The number of calluses increased with decreasing bone mineral content. The location of the calluses corresponded to the location of experimental in vitro compression fractures of the vertebral bodies.

133. Harlap, S. and Davies, A.M. Infant admissions to hospital and maternal smoking. Lancet 1(857):529-32, 1974.

ABSTRACT: Admissions to the hospital during the first year of life were recorded in a prospective study of 10,672 infants whose mothers' smoking habits were known. Infants with major congenital malformations, and those dying before their first birthday, were excluded. The infants of mothers who smoked had significantly more admissions for bronchitis or pneumonia, especially in the winter, and more injuries. They were also admitted more frequently, though not significantly so, for upper respiratory-tract infections, gastroenteritis, childhood infectious disease, and other diagnoses. The excess of bronchitis and pneumonia in the group exposed to smoke increased with increasing number of cigarettes smoked by the mother. It occurred within subgroups of birth-weight, social class, and birth order. It was seen mainly in infants aged 6-9 months, while at older and younger ages there was no significant effect of maternal smoking. The findings support the hypothesis that atmospheric pollution with tobacco smoke endangers the health of non-smokers.

COMMENTS: *An excess of injuries occurred in firstborns. A "certain excess was predicted for all birth-order groups, since substances in tobacco smoke may reduce visual and hearing acuity among other indices of sensory and motor function." Why the excess was confined to first-born babies was not clear. The authors considered the effects of second hand smoke, but did not consider that the smokers themselves may be directly responsible for the injuries of their children. Several other factors to be considered are behavioral differences between smoking and non-smoking moms, possible tobacco-related cognitive or neuromuscular deficits, concomitant alcohol abuse, or potential child abuse or neglect. (PJA)*

134. Hatsukami, D., Fletcher, L., Morgan, S., Keenan, R. and Amble, P. The effects of varying cigarette deprivation duration on cognitive and performance tasks. J Subst Abuse 1(4):407-16, 1989.

ABSTRACT: The effects of varying times of cigarette deprivation on cognitive and performance tasks were examined. This study employed a between-subjects design in which five groups of smokers (9-10 subjects in each group) were compared on a vigilance task and cognitive measures as a function of length of deprivation (0, 2, 4, 8, or 24 hours). Each subject was tested during baseline ad-lib smoking and at one of the deprivation durations. Difference scores were compared between the 0-hour group and the 2-, 4-, 8-, and 24-hour groups. The results showed that there were no significant withdrawal effects on the measures at 2, 4, and 8 hours after cigarette deprivation with the exception of poorer performance on the Trail Making Test (B) at 4 hours. However, there were significant withdrawal effects at 24-hours deprivation. These included increased mean reaction time, increased variability in reaction time, and increased errors of commission on the vigilance task. There were near significant changes at 24-hours deprivation on the Trail Making Test (B) and Symbol Digits Modalities.

135. Hatsukami, D., Anton, D., Keenan, R. and Callies, A. Smokeless tobacco abstinence effects and nicotine gum dose. Psychopharmacology (Berl) 106(1):60-6, 1992.

ABSTRACT: There were two experiments on abstinence from smokeless tobacco. The purpose of the first experiment was to determine abstinence effects from smokeless tobacco. The purpose of the second experiment was to examine the effects of different doses of nicotine gum on smokeless tobacco abstinence effects. The subjects were male Copenhagen smokeless tobacco users who underwent 3 days of baseline measurement while continuing to use smokeless tobacco ad libitum, and 5 days of the experimental condition. In the first experiment, the subjects were assigned randomly to one of two groups and compared: continuous smokeless tobacco users ($n = 10$), and deprivation plus no nicotine gum ($n = 10$). In the second experiment, subjects were assigned randomly and in a double-blind fashion to one of three groups and compared: (1) deprivation plus 0 mg nicotine gum ($n = 20$); (2) deprivation plus 2 mg

nicotine gum ($n = 20$); and (3) deprivation plus 4 mg nicotine gum ($n = 20$). The first experiment showed significant increases upon abstinence for the following variables: (1) craving; (2) difficulty concentrating; (3) restlessness; (4) excessive hunger; (5) eating; (6) reaction time; (7) variability of reaction time and (8) total withdrawal scores for both the self-rated and the observer-rated forms. The second experiment showed that nicotine gum failed to significantly reduce smokeless tobacco abstinence effects, although those with high cotinine levels may receive some benefit from nicotine gum.

COMMENTS: *Smokeless tobacco use has been increasing among U.S. Army soldiers. Its use is important in its own right for the known health effects, including those discussed in this article. Perhaps the most worrisome aspect of this study is the withdrawal effects of smokeless tobacco (which appear to be little different from those of smoking). However, there is more than what meets the eye in these findings. While one could make a case for control of smokeless tobacco use in the military, it must also be realized that smokers often use chewing tobacco to hold off nicotine withdrawal at times when smoking is impossible or impractical such as flying, parachuting, etc. (PJA)*

136. Heimstra, N.W., Bancroft, N.R. and Dekock, A.R. Effects of smoking upon sustained performance in a simulated driving task. *Ann NY Acad Sci* 142:295-307, 1967.

COMMENTS: *Author's summary: The purpose of the investigation was to determine the effects of smoking upon performance during sustained operation of a simulated driving device. Subjects were assigned to a non-smoker group, a smoker group, or a deprived smoker group. They operated the driving device for 6 consecutive hours. Measures of tracking error, reaction time and vigilance performance were obtained. In addition, all subjects completed a Nowlis Mood Scale before and after the test session. Results showed no significant differences between smokers and non-smokers in the various measures involved in the driving device. Deprived smokers, however, showed significantly more tracking error and vigilance errors than subjects in the other groups. Data from the mood scale suggest that smoking may have an influence on mood change. (PJA)*

137. Heliövaara, M. Risk factors for low back pain and sciatica. *Ann Med* 21:257-264, 1989.

ABSTRACT: So far, eight prospective studies and 50 cross-sectional or retrospective studies have focused on risk factors for low back syndromes. Half of these have been published during the 1980s. Hard physical work and, in particular, frequent lifting and postural stress are likely to result in disc degeneration, low back pain and sciatica. Physical strain may also have prophylactic effects, as physical leisure activity and muscular strength are negatively associated with the risk of low back pain. Much evidence points to driving motor vehicles being causally associated with low back pain and sciatica. A probably causal relationship exists between body height and risk of sciatica, but height is not necessarily predictive of other types of low back pain. Obesity, smoking, psychological distress and poor general health also carry increased risk of low back pain, but their causal role is questionable. Although none of the suspected risk factors can be described as having been conclusively investigated epidemiologically, the results of published studies show that there are modifiable factors contributing to low back pain. The overall potential of primary prevention is great if adequate tools for intervention can be developed.

138. Heliövaara, M., Mäkelä, M., Knekt, P., Impivaara, O. and Aromaa, A. Determinants of sciatica and low-back pain. *Spine* 16(6):608-614, 1991.

ABSTRACT: Several factors were studied for their association with the prevalence of chronic low-back syndromes, sciatica, and unspecified low-back pain (LBP) in 2,946 women and 2,727 men (age range, 30-64 years) participating in the Mini-Finland Health Survey, a project aimed at comprehensive evaluation of

the population's health. On the basis of standardized clinical examination, a physician diagnosed sciatica in 5.1% and LBP in 11.6% of the subjects. Those with a previous traumatic back injury had 2.5-fold risk of having sciatica or LBP. The fractions of sciatica and LBP attributable to such back injuries were estimated to 16.5% and 13.7%, respectively. Sum indices of both physical and mental stress at work were found to be directly proportional to the prevalence of sciatica and LBP. Smokers had an increased risk of LBP, and body height was related positively to the prevalent (adjusted odds ratio [OR], 5.3; 95% confidence interval [CI], 4.1-6.9), but sciatica was not (OR, 1.1; 95% CI, 0.7-1.7). Diabetics were found to have a significantly decrease prevalence of LBP (OR, 0.4; 95% CI 0.3-0.8). Many factors, independent of each other, determine the occurrence of chronic low-back syndromes. The determinants of sciatica and LBP are different to some extent.

139. Helliwell, P.S., Mumford, D.B., Smeathers, J.E. and Wright, V. Work related upper limb disorder: the relationship between pain, cumulative load, disability, and psychological factors. Ann Rheum Dis 51(12):1325-9, 1992.

ABSTRACT: Repetitive strain injury, or work related upper limb disorder, provides an interesting paradigm for the study of the relative contribution of physical and psychological factors to the resulting pain and disability. Sixty three subjects were studied, comprising the work-force of a subsection of a large local industrial company, in whom pain in the arm related to work was known to be common. Ergonomic data were obtained by estimating the cumulative daily load on the wrist joint for each of four identified tasks. Data on the occurrence of pain, treatment sought, and disability were obtained by a structured self administered questionnaire. Psychological data were obtained by administering the Hospital Anxiety and Depression (HAD) scale, a self reported measure of anxiety and depression, and the Bradford Somatic Inventory (BSI), an inventory of somatic symptoms associated with anxiety and depression. The employment specific period prevalence of work related upper limb disorder was 81%, with 30% of the subjects having pain at the time of the study. Domestic disability was minimal in all but two subjects, though the use of devices such as jar openers at home was common (12 of 51 subjects). Medical advice was seldom sought. Twenty per cent of subjects had received anti-inflammatory drugs, 10% had received physiotherapy, and 47% had wrist splints. Pain was related to the tasks with the highest estimated daily loads, but a history of pain and current pain were associated with higher scores on the HAD and BSI scales, suggesting an interaction between physical and psychological factors.

140. Helsing, K.J. and Comstock, G.W. What kinds of people do not use seat belts? Am J Public Health 67(11):1043-50, 1977.

ABSTRACT: In the course of a Community Mental Health Epidemiology study conducted in Washington County, Maryland between December, 1971 and July, 1974, interviews were conducted with randomly selected adults in a weekly systematic sampling of households. In a subsequent re-interview of 1009 respondents who had family cars with seat belts, nearly 47 per cent said they did not use them. Non-use of seat belts was significantly higher among females and among persons with less than high school education or low income. Non-use of seat belts was also higher among those who felt that their station in life as measured by the Cantril ladder was unsatisfactory, who felt powerless to change at least some aspects of their lives, and who were infrequent church attenders. Significant associations were also found with infrequency of two other preventive health behaviors, dental checkups and Pap tests. Among young adults the tendency seemed to be for marriage to increase the non-use of seat belts among females but to decrease non-use among males.

COMMENTS: While not a major interest of this paper, the authors did report seat belt usage rates among smokers in their survey: 149 of 324 non-smokers (46%), 17 of 37 who smoke 1-14 cigarettes per day (45.9%), 41 of 83 who smoked 14-34 cigarettes per day (49.4%), and 9 of 15 who smoked 35 or more per day (60.0%). This finding supports a possible cause of higher motor vehicle injury rates among smokers, and it also supports the notion of smokers being greater risk takers. (PJA)

141. Hemenway, D., Colditz, G.A., Willett, W.C., Stampfer, M.J. and Speizer, F.E. Fractures and lifestyle: effect of cigarette smoking, alcohol intake, and relative weight on the risk of hip and forearm fractures in middle-aged women. Am J Public Health 78(12):1554-8, 1988.

ABSTRACT: Cigarette smoking, alcohol consumption and low relative weight are often cited as risk factors for osteoporosis. In a prospective cohort study of 96,508 middle-aged nurses 35 to 59 years of age we found that smoking was not a risk factor for hip and forearm fracture. Women who drank more than 15 grams of alcohol per day and whose relative weight was less than 21 Kg/m² were at increased risk of fractures, but these risk factors were not independent. Only the combination of alcohol intake and thinness substantially increased the likelihood of fracture. The low weight women consuming more than one drink per day comprised but 4 percent of our population of middle-class women and sustained 6% of the fractures.

COMMENTS: *This study, despite a few limitations discussed by the authors, would seem to refute the findings of other studies which have found higher incidence of fractures among smokers. (PJA)*

142. Hemenway, D., Solnick, S.J. and Colditz, G.A. Smoking and suicide among nurses [see comments]. Am J Public Health 83(2):249-51, 1993.

ABSTRACT: Current evidence suggests a strong positive correlation between cigarette consumption and depression; this study examined the relationship between cigarettes and suicide. Over 100,000 predominantly White, middle-aged, female registered nurses were followed via biannual questionnaires from 1976 through 1988. Respondents smoking 1 through 24 cigarettes per day had twice the risk and those smoking 25 or more cigarettes four times the risk of committing suicide, compared with those who had never smoked. Although no information on causation was available, this paper links cigarettes to another major health problem.

COMMENTS: *This succinct article exposes yet another link between smoking and an injury outcome -- in this case, suicide. The authors attribute their findings to the direct link between smoking and depression, serious illness, and alcoholism. Smoking is also related to other mental health problems, such as schizophrenia, which are related to self-destructive behavior. (PJA)*

143. Henderson, V. and Enterline, P.E. An unusual mortality experience in cotton textile workers. J Occup Med 15(9):717-9, 1973.

144. Henningfield, J.E. and Keenan, R.M. Nicotine delivery kinetics and abuse liability. J Consult Clin Psychol 61(5):743-50, 1993.

ABSTRACT: It is well established that nicotine meets all criteria of a highly addictive drug. However, as recognized by the U.S. surgeon general, the nicotine delivery system itself is an important determinant of the toxic and addictive effects engendered by nicotine use. Therefore, altering the form of nicotine dosing may allow for selective therapeutic action in efforts to develop safer and less addictive nicotine replacement therapies. While it is the case that initial tobacco use often escalates to compulsive use accompanied by tolerance and physical dependence, this is not usually observed with nicotine replacement therapies. These observations are consistent with laboratory data indicating that (a) nicotine polacrilex and transdermal systems deliver nicotine more slowly and at lower dose levels than tobacco-based forms, and (b) human data suggesting that the abuse liability of these systems is substantially lower than that of the tobacco-based nicotine delivery systems. Because the drug dosage form can be systematically manipulated and evaluated, further research in developing alternative nicotine delivery

forms may hold substantial promise in the treatment of tobacco dependence. Psychological research methods can play an important part in their evaluation.

145. Henningfield, J.E. Do the benefits of nicotine help cigarettes beat the addiction rap? Addiction 89:135-6, 1994.

146. Herrick, A.L., Rieley, F., Schofield, D., et al. Micronutrient antioxidant status in patients with primary Raynaud's phenomenon and systemic sclerosis. J Rheumatol 21(8):1477-83, 1994.

ABSTRACT: **OBJECTIVE:** To investigate the possibility that micronutrient antioxidant status is an important factor in determining the severity of Raynaud's phenomenon (RP) and in differentiating between patients with primary Raynaud's phenomenon (PRP) and those in whom Raynaud's is secondary to systemic sclerosis (SSc). **METHODS:** Four micronutrient antioxidants (selenium, vitamin E, beta-carotene and ascorbic acid) and 2 markers of free radical associated activity were assayed in peripheral blood from 10 patients with PRP, 9 with limited cutaneous SSc (ISSc), 9 with diffuse SSc (dSSc) and 15 healthy control subjects. **RESULTS:** Plasma ascorbic acid was reduced in all 3 groups of patients: median level 10.6 mg/l in controls, 4.8 mg/l in PRP ($p < 0.01$), 2.5 mg/l in ISc ($p < 0.01$) and 6.8 mg/l in dSSc ($p < 0.05$). A reduction in serum selenium was especially found in dSSc (median 75 micrograms/l compared to 100 micrograms/l in controls, $p < 0.05$). In keeping with these deficiencies, the serum concentration of 9, 11, linoleic acid was elevated in RP patients: median values for the molar ratio of the isomer to the parent fatty acid were 1.91% in controls, 3.70% in ISc ($p < 0.05$) and 3.85% in dSSc ($p < 0.01$). **Smoking** patients showed lower levels of ascorbic acid and higher levels of the linoleic isomer than non-smokers. **CONCLUSION:** Deficiencies of ascorbic acid and selenium may predispose towards irreversible tissue injury in RP patients and cigarette smoke may be an independent risk factor. Micronutrient antioxidant supplements may be of therapeutic value.

147. Hilton, J.F., Walsh, M.M., Masouredis, C.M., et al. Planning a spit tobacco cessation intervention: identification of beliefs associated with addiction. Addict Behav 19(4):381-91, 1994.

ABSTRACT: We examine the relationship between beliefs regarding spit tobacco (ST) use and addiction among 473 male college athletes who currently use ST. Beliefs were assessed using methods prescribed by the Theory of Reasoned Action. Independent associations between beliefs and addiction, defined by self-reported amount of ST used per week, were found via multivariate polychotomous regression modeling. We found that with increasing addiction level, athletes were significantly more likely to believe that ST helps me relax, ST keeps me alert, ST tastes good, and ST is addicting. All athletes believed that clinicians, parents, and girlfriends do not approve of their ST use, but that male peers, coaches, and professional athletes are fairly indifferent about it. To increase quit rates, highly addicted ST users may require an intensive cessation program including nicotine replacement to overcome symptoms of withdrawal, oral substitutes for the enjoyable taste of ST, and the support of male peers and athletes who influence their social norms.

148. Hindmarch, I., Kerr, J. and Sherwood, N. Effects of nicotine gum on psychomotor performance in smokers and non-smokers. Psychopharmacology 100:535-541, 1989.

ABSTRACT: Two experiments were conducted to investigate the effects of nicotine on human performance. In the first study six smokers, who had been allowed to smoke normally prior to testing, completed a battery of psychometric tests (choice reaction time, memory scanning, tracking and flicker

fusion threshold) at set points over 4 h after chewing 0, 2, or 4 mg nicotine polacrilex gum. A second study followed a similar design, but used five non-smoker volunteers who were required to chew only the 0 or 2 mg nicotine gum. Blood nicotine levels following the gum were measured in all subjects. The results indicate that additional nicotine improved both the speed and accuracy of motor activity among the smokers, but did not enhance central cognitive processes. No drug effects were found in the non-smoker study.

COMMENTS: *In this study nicotine had no significant effect on any performance measures in non-smokers. This is further evidence against the popular notion among smokers and chewers that nicotine gives them a performance and/or cognitive boost. (PJA)*

149. Hirota, Y., Hirohata, T., Fukuda, K., et al. Association of alcohol intake, cigarette smoking, and occupational status with the risk of idiopathic osteonecrosis of the femoral head. Am J Epidemiol 137(5):530-8, 1993.

ABSTRACT: To investigate the association of alcohol intake, cigarette smoking, occupation, and other factors with the development of idiopathic osteonecrosis of the femoral head, a nationwide multicenter case-control study was conducted in Japan during 1988-1990, comparing 118 cases with no history of systemic corticosteroid use with 236 controls matched for sex, age, ethnicity, clinic, and date of initial examination. The risks of developing femoral head necrosis associated with potential risk factors were estimated by adjusted relative odds obtained by a conditional logistic regression model. The elevated relative odds were observed for occasional drinkers (relative odds = 3.2, 95% confidence interval 1.1-9.2) and regular drinkers (relative odds = 13.1, 95% confidence interval 4.1-42.5) with a significant dose-response relation ($p < 0.001$). For current drinkers, the relative odds were 2.8, 9.4, and 14.8 for < 320, 320-799, and > or = 800 g/week of ethanol intake, respectively. An increased risk was found for current smokers (relative odds = 4.7, 95% confidence interval 1.5-14.5), but a linear increasing trend in the cumulative effect of smoking was not evident at 20 pack-years or over. A weak but significant dose-response relation was observed for daily occupational energy consumption ($p < 0.05$). The present study confirmed the strong association of alcohol intake and positive association of cigarette smoking and suggested the role of heavy physical work.

150. Hoilberg, A. and White, J.F. Tracking Health Promotion Data in the U.S. Navy. Defense Technical Report #AD-A252 714, 1991.

ABSTRACT: The purpose of this pilot study was (a) to create a machine-scannable instrument to be used to collect health promotion information of Navy personnel and (b) to evaluate the effectiveness of the form in terms of understandability and efficiency. Although the overall response rate per item was quite high, problem items included those pertaining to respondents' diet, back injuries, blood pressure levels, and cholesterol measures. Other results identified decreases in tobacco and alcohol use from findings of previous research. Cholesterol levels and percentages of back problems increased with age. In general, progress is being made toward improved health and physical readiness among Navy personnel. The next phase is to examine the effectiveness of the revised tracking form on a larger sample and to examine the feasibility of developing an electronic health promotion tracking system that can be implemented Navy wide.

151. Holbrook, T.L., Barrett-Connor, E. and Wingard, D.L. Dietary calcium and risk of hip fracture: 14-year prospective population study. Lancet 2(8619):1046-9, 1988.

ABSTRACT: To assess the effect of dietary calcium intake on risk of hip fracture, a geographically defined caucasian population in southern California was studied prospectively. Between 1973 and 1975, a quantified 24 hour diet recall was obtained by a dietitian from 957 men and women aged 50 to 79 years at

baseline. Follow-up to 1987 with mortality records and interviews showed 15 men and 18 women with hip fractures. The age-adjusted risk of hip fracture was inversely associated with dietary calcium whether considered as mg per day or as nutrient density (mg per 1000 kcal). No other nutrient was consistently associated with hip fracture in any Cox proportional hazards model that included calcium. The association between calcium and fracture persisted after adjustment for cigarette smoking, alcohol intake, exercise, and obesity. The significant independent inverse association of dietary calcium with subsequent risk of hip fracture (relative risk = 0.6 per 198 mg/1000 kcal) strongly supports the hypothesis that increased dietary calcium intake protects against hip fracture.

152. Honkanen, R. and Smith, G.S. Impact of acute alcohol intoxication on the severity of injury: A cause-specific analysis of non-fatal trauma. Injury 21:353-7, 1990.

ABSTRACT: The impact of alcohol on the severity of injury was studied by using injured patients from an emergency room in Helsinki, Finland. Blood alcohol content was estimated either clinically or with a breath test and then was recorded using a three-grade intoxication code (Ethyl sign). The study population was comprised of 14,995 men aged 15-64 years. The Ethyl sign was positive in 19.7 percent. Hospitalization was used as an indicator of the severity of injury. Hospitalization was almost as common among sober (9.3 percent) as among intoxicated patients (9.6 percent) and the odds of being hospitalized i considered 1.0 among the sober, 1.03 among the intoxicated. However, the severity of injury correlated positively with the alcohol intoxication in the injured car occupants with an odds ratio (OR) of 3.1 (95 percent confidence interval (CI) 1.7-5.6) and in those injured in falls from stairs (OR = 2.6; 95 percent CI 1.4-4.7), but negatively in those injured in unspecified falls on the small level (OR = 0.3; 95 percent CI 0.2-0.6). The effect of alcohol on injury severity seems to vary with the cause of injury.

153. Hope, A. Smoke gets in your eyes. New Zealand Medical Journal 21:10-11, 1974.

154. Hopper, J.L. and Seeman, E. The bone density of female twins discordant for tobacco use. N Eng J Med 330(6):387-392, 1994.

ABSTRACT: **BACKGROUND:** Smoking is recognized as a risk factor for vertebral, forearm, and hip fractures. Since bone density is an important determinant of bone strength, we conducted a study to ascertain whether a deficit in bone density is associated with tobacco use and, if so, to identify the responsible mechanisms. **METHODS:** We conducted a cross-sectional study of bone density at the lumbar spine and the femoral neck and shaft in 41 pairs of female twins (21 monozygotic pairs), 27 to 73 years of age (mean 49), who were discordant for at least 5 pack-years of smoking (mean, 23; maximum 64). Bone density was measured by dual-photon absorptiometry. The difference in bone density between the members of a pair was expressed as a percentage of the mean value for the pair. **RESULTS:** For every 10 pack-years of smoking, the bone density of the twin who smoked more heavily was 2.0 percent lower at the lumbar spine ($P=0.001$), 0.9 percent lower at the femoral neck ($P=0.25$), and 1.4 percent lower at the femoral shaft ($P=0.004$). These results were not confounded by measured lifestyle factors. In the 20 pairs who were discordant by 30 or more pack-years (mean 35), the (mean +/- SE) within-pair differences in bone density at three sites were 9.3+/-3.1 percent ($P=0.008$), 5.8+/-2.9 percent ($P=0.06$), and 6.5+/-3.2 percent ($P=0.05$), respectively. Smoking was associated with higher serum concentrations of follicle-stimulating hormone ($P=0.02$) and luteinizing hormone ($P=0.03$) and lower serum concentrations of parathyroid hormone ($P=0.01$) and calcium ($P=0.05$) and urinary pyridinoline excretion ($P=0.06$), a marker of bone resorption. **CONCLUSIONS:** Women who smoke one pack of cigarettes each day throughout adulthood will, by the time of menopause, have an average deficit of 5 to 10 percent in bone density, which is sufficient to increase the risk of fracture. (N Engl J Med 1994;330:387-92.)

COMMENTS: *This is a good discussion on the relationship of smoking and risk for vertebral, forearm, and*

hip fractures in adult females. The study findings supported the hypothesis that tobacco use causes a reduction in circulating levels of estrogen which leads to increased bone resorption and bone fragility. This may be a biological mechanism for increased risk of stress fractures reported in female soldiers that smoke. (KLR)

155. Hoszowski, K., Gawron, J., Korczyk, P., et al. [Analysis of risk factors and prevalence of spinal osteoporosis in a population sample of Warsaw residents over 50 years of age]. Pol Tyg Lek 48 Suppl 3:31-5, 1993.

ABSTRACT: Vertebral fractures are the one typically seen in osteoporosis. An incidence of vertebral body fractures and risk factors for osteoporosis were analyzed in the retrospective population based epidemiological study. Population sample included 607 Warsaw inhabitants aged between 50 and 80 years (301 women and 306 men divided into age groups of 5 years, including approx. 50 subjects each). Vertebral body fractures were diagnosed on thoraco-lumbar spine X-rays made in the lateral projection. Risk factors for osteoporosis were analyzed with the aid of an questionnaire. Bone mineral density was measured with dual energy X-ray absorptiometry and single photon absorptiometry in about 1/3 of the examined women. The prevalence of vertebral osteoporosis was high in both women (20.5%) and in men (27.8%). Low dietary calcium intake (below 800 mg daily) and low serum vitamin D levels (250HD less than 11 micrograms/ml) were characteristic for about 90% of the examined population. In osteoporotic subjects the following risk factors were significantly more frequent: age ($p < 0.01$), tobacco smoking ($p < 0.001$), low physical activity ($p < 0.05$), long-term immobilization ($p < 0.01$). Densitometry showed significantly lower bone mineral density in both women with vertebral fractures ($p < 0.01$) and low serum vitamin D levels ($p < 0.05$). Osteoporotic vertebral fractures were diagnosed more frequently in women with early menopause ($p < 0.001$). In the examined population there is a high prevalence of vertebral osteoporosis (predominating in mean) and risk factors.

156. Hughes, J.R. Tobacco withdrawal in self-quitters. J Consult Clin Psychol 60(5):689-97, 1992.

ABSTRACT: Self-reported and observer-rated signs and symptoms of nicotine withdrawal were assessed precessation and 2, 7, 14, 30, 90, and 180 days postcessation in smokers who quit on their own for 30 days. Anxiety, difficulty concentrating, hunger, irritability, restlessness, and weight gain increased, and heart rate decreased, postcessation (p less than .001). Except for hunger and weight gain, these symptoms returned to precessation levels by 30 days postcessation. Craving, depression, and alcohol or caffeine intake did not reliably increase. Postcessation depression, but not withdrawal symptoms, craving, or weight gain, predicted relapse. These results are consistent with prior studies.

157. Hughes, J.R. Pharmacotherapy for smoking cessation: unvalidated assumptions, anomalies, and suggestions for future research. J Consult Clin Psychol 61(5):751-60, 1993.

ABSTRACT: This article questions several assumptions about the rationale for pharmacological therapies for smoking cessation, including whether (a) future smokers will be those more dependent on nicotine and thus in greater need of nicotine replacement or other pharmacotherapy, (b) transdermal nicotine and nicotine gum work by reducing withdrawal symptoms, and (c) clonidine works by decreasing sympathetic arousal. After describing currently available pharmacotherapies, the article also describes several unexpected findings that need to be taken into consideration by clinicians: (a) transdermal nicotine is effective when given without psychological therapy, (b) transdermal nicotine and nicotine gum do not consistently decrease postcessation weight gain, (c) high level of nicotine dependence does not consistently predict better response to transdermal nicotine, and (d) clonidine is effective in women but not in men. The article poses other questions for future research.

158. Hughes, J.R., Higgins, S.T. and Bickel, W.K. Nicotine withdrawal versus other drug withdrawal syndromes: similarities and dissimilarities. Addiction 89(11):1461-70, 1994.

ABSTRACT: Many of the symptoms of nicotine withdrawal are similar to those of other drug withdrawal syndromes: anxiety, awakening during sleep, depression, difficulty concentrating, impatience, irritability/anger and restlessness. Slowing of the heart rate and weight gain are distinguishing features of tobacco withdrawal. Although nicotine withdrawal may not produce medical consequences, it lasts for several weeks and can be severe in some smokers. Like most other drug withdrawals, nicotine withdrawal is time-limited, occurs in non-humans, is influenced by instructions/expectancy and abates with replacement therapy and gradual reduction. Unlike some other drug withdrawal syndromes, protracted, neonatal or precipitated withdrawal does not occur. Whether nicotine withdrawal is associated with tolerance, acute physical dependence, greater duration and intensity of use, rapid reinstatement, symptom stages, cross-dependence with other nicotine ligands, reduction by non-pharmacological interventions and genetic influences is unclear. Whether nicotine withdrawal plays a major role in relapse to smoking has not been established but this is also true for other drug withdrawal syndromes.

COMMENTS: *This article lists the symptoms of nicotine withdrawal that are "highly reproducible, observable by others and [that] may be clinically significant" -- anxiety, craving, decreased heart rate, depression, difficulty concentrating, hunger, irritability, nocturnal awakenings, and restlessness. The article also provides several charts which illustrate the time course of these symptoms from 0-180 days. Any of the acute manifestations of nicotine withdrawal could contribute to increased exposure to injury hazards. (PJA)*

159. Hultberg, B., Isaksson, A., Brattstrom, L. and Israelsson, B. Elevated urinary excretion of beta-hexosaminidase in smokers. Eur J Clin Chem Clin Biochem 30(3):131-3, 1992.

ABSTRACT: The excretion of urinary beta-hexosaminidase in 203 apparently healthy males and females correlated significantly with their tobacco consumption ($r = 0.26$; p less than 0.001). Those who smoked more than 10 g tobacco per day excreted significantly more beta-hexosaminidase in urine than non-smokers, which indicates the presence of a low grade renal injury in smokers.

160. Hunt, D., Lowenstein, S., Badgett, R. and Marine, W. Detection of injury-prone behaviors among internal medicine patients. Journal of General Internal Medicine 7(6):573-582, 1992.

ABSTRACT: **OBJECTIVES:** 1). To describe the prevalence of eight injury-prone behaviors (IPBs) and the associations of these behaviors with ten standard chronic disease and sociodemographic risk factors (CDSRFs) among internal medicine patients. and 2). To identify a subset of patients with multiple IPBs who might be at particularly high risk of injury. **DESIGN:** Cross-sectional survey. **SETTING:** The University of Colorado Health Science Center general internal medicine clinic. **PATIENTS:** Four hundred ninety-two consecutive continuity care patients were eligible. The response rate was 94.3% (464/492). **Instrument:** A validated, self-administered questionnaire. **MAIN RESULTS:** thirty-four percent of patients did not wear safety belts regularly and 32% had no smoke detector in their homes. Nearly 26% of patients had firearms at home and 6% had a loaded and unlocked gun at home. Fourteen percent of patients had seriously thought about suicide and 6% had attempted suicide. In the prior month, 10% had ridden with a drunk driver, and 4 % had driven after drinking too much. Of patients aged 65 years or older, 50% had had recent falls. After adjustments for other CDSRFs, problem drinking was the CDSRF most frequently associated with IPBs. Among men, problem drinking was significantly associated with drinking and driving

(OR=35.3), safety belt non-use (OR=4.3), and previous thoughts or attempts at suicide (OR=6.2). Among women, problem drinking was significantly associated with drinking and driving (OR=8.7). Among men, being unmarried was the demographic risk factor associated with the most IPBs. Of all IPBs, safety belt non-use was most frequently associated with the most CDSRFs (ORs ranged from 2.8 to 4.4). Men with three or more IPBs were more likely to be problem drinkers (OR=9.6), smokers (OR=15.8), obese (OR=6.3), and unmarried (OR=67.1). Conclusions: 1). Injury-prone behaviors are common among patients attending a university-based internal medicine clinic; 2). men and women have substantially different patterns of risk factor associations; 3). CDSRFs, such as problem drinking, smoking, and being unmarried, are associated with many IPBs; 4). safety belt non-use is the IPB associated with the most CDSRFs; 5). CDSRFs appear to cluster in men with multiple IPBs, suggesting that screening for high-risk individuals may be feasible in clinical practice.

161. Jackson, D.L. and Menges, H. Accidental carbon monoxide poisoning. JAMA 243(8):772-4, 1980.

ABSTRACT: There is an increased risk for accidental carbon monoxide poisoning in the modern urban environment. Improved building insulation, space heaters, and internal combustion engines are sources of carbon monoxide exposure. Cigarette is another environmental source of carbon monoxide exposure. Inhaled smoke of most cigarettes contains 400 ppm of carbon monoxide. This is either times higher than the industrial standard set by the Occupation Safety and Health Administration for an eight-hour daily exposure (50 ppm). Persons actively or passively exposed to cigarette smoke could be at high risk of serious carbon monoxide poisoning if residing in a tightly sealed environment. The authors stress that the major mechanism for the toxicity of carbon monoxide is the impairment of delivery of oxygen to the tissues. Extremely high levels of carbon monoxide may compromise patients with underlying cardiovascular disease. Carbon monoxide may also lead to hypoxic damage to the central nervous system resulting in alterations in personality and cognitive functions that may be long term. The report stresses the importance of the early diagnosis of carbon monoxide poisoning and the immediate treatment with high forced inspiratory oxygen.

COMMENTS: *This is an informative report on potential mechanisms of carbon monoxide toxicity. It also makes an important point that cigarette smoke is an environmental source of carbon monoxide. The implications that cigarette smoke exposure may carry some risks of carbon monoxide toxicity that may be associated with cardiovascular and neuropsychiatric effects cannot be overemphasized. (KLR)*

162. Jarvis, M., Tunstall-Pedoe, H., Feyerabend, C., Vesey, C. and Salloojee, Y. Biochemical markers of smoke absorption and self reported exposure to passive smoking. J Epidemiol Community Health 38(4):335-9, 1984.

ABSTRACT: One hundred non-smoking patients attending hospital outpatient clinics reported their degree of passive exposure to tobacco smoke over the preceding three days and provided samples of blood, expired air, saliva, and urine. Although the absolute levels were low, the concentration of cotinine in all body compartments surveyed was systematically related to self reported exposure. Salivary nicotine concentration also showed a linear increase with degree of reported exposure, although this measure was sensitive only to exposure on the day of testing. Measures of carbon monoxide, thiocyanate, and plasma nicotine concentrations were unrelated to exposure. The data indicate that cotinine provides a valid marker of the dose received from passive smoke exposure. The non-invasive samples of urine and saliva are particularly suited to epidemiological investigations. Detailed questionnaire items may also give valuable information.

163. Jensen, J., Christiansen, C. and Rodbro, P. Cigarette smoking, serum estrogens, and bone loss during hormone-replacement therapy early after menopause. N Engl J

Med 313(16):973-5, 1985.

ABSTRACT: To elucidate the effect of smoking on estrogen metabolism, we examined 136 postmenopausal women treated for one year with one of three different doses of combined estrogen-progestogen or placebo. The women were grouped according to smoking status, and serum levels of estrone and estradiol were measured before and after treatment. The results showed reduced levels of both estrogens in smokers as compared with non-smokers in all three dosage groups. This reduction was most pronounced in the high-dose group (4 mg of estradiol), in which the serum levels of estrone and estradiol in smokers were only 50 per cent of those in non-smokers (P less than 0.001 and less than 0.05, respectively). In contrast, no significant changes could be demonstrated in the corresponding placebo groups. Moreover, it was possible to demonstrate significant inverse correlations between the number of cigarettes smoked daily and the changes in the levels of serum estrone and estradiol, respectively, (P less than 0.001). This study suggests that an increased hepatic metabolism of estrogens results in lower estrogen levels among postmenopausal smokers. This may contribute to the reported risk of osteoporosis among smokers.

164. Johansson, C., Mellström, D., Lerner, U. and Österberg, T. Coffee drinking: A minor risk factor for bone loss and fractures. Age and Aging 21:20-26, 1992.

ABSTRACT: The influence of coffee drinking as a possible risk factor for loss of bone mass was assessed in a cohort of 619 70-year-old men and women who were examined with dual photon absorptiometry of the right calcaneum. A high consumption of coffee was significantly associated with a lower bone mass, deteriorated dental state, lower socioeconomic level and a higher consumption of tobacco. In non-smoking women a bivariate relationship was found between the daily consumption of three or more cups of coffee and a low bone mass ($p<0.001$). However, in a stepwise logistic regression model, only tobacco smoking, body mass index, body height, physical activity and a deteriorated dental state were found to be significant predictive factors for a low bone mineral content. Bone mass and tobacco smoking were the only significant predictive factors for fractures before the ages of 70 and 76 years. Coffee drinking was not a contributory independent risk factor for loss of bone mass and fractures in this population study.

165. Johnston, J.D. Smokers have less dense bones and fewer teeth. J R Soc Health 114(5):265-9, 1994.

ABSTRACT: Women and men who smoke are more slender than their non-smoking counterparts and have a bone density appropriate to their degree of slenderness. As a result, they are more likely to sustain a fracture than their non-smoking counterparts. The lower bone density found in smokers may arise because of less stress and strain imposed on the skeleton by a slim physique. Smokers have poorer oral hygiene and less teeth than their non-smoking counterparts. The relationship between smoking and tooth pathology remains unclear: smoking may either act via a direct mechanism based on the toxicity of tobacco smoke or indirectly through body weight (ie the effect on teeth is part of a wider effect on bone structure).

166. Jones, R.B. Use of smokeless tobacco in the 1986 World Series [letter]. N Engl J Med 316(15):952, 1987.

167. Jones, R.B. and Moberg, D.P. Correlates of smokeless tobacco use in a male adolescent population. Am J Public Health 78(1):61-3, 1988.

ABSTRACT: This paper identifies the correlates of smokeless tobacco use in a sample of 1,030 males representative of 7th through 12th grade students of Dane County (Madison), Wisconsin. Variables

independently associated with frequent use of smokeless tobacco were: being White; living in other than a two-parent home; performing poorly in school; smoking cigarettes; consuming beer, wine, or hard liquor; and deviant/delinquent behavior. Participation in team sports was associated with some experimentation with smokeless products.

168. Jones, J.K and Triplett, R.G. The relationship of cigarette smoking to impaired Intraoral wound healing: A review of evidence and implications for patient care. Journal of Maxillofacial Surgery 50:237-9, 1992.

ABSTRACT: Cigarette smoking has long been suspected to adversely effect wound healing. Review of our experiences with impaired wound healing in patients undergoing intraoral bone grafting and simultaneous implant placement implicated smoking as a potentially significant risk factor. Fifteen consecutive adult patients (5 smokers and 10 non-smokers) who underwent intraoral bone grafting with simultaneous implant placement were retrospectively reviewed. Five of the fifteen patients experienced impaired wound healing defined as loss of bone and/or implants. Four of these five (80%) admitted to smoking in the perioperative period. One of 10 non-smokers experienced problematic healing (10%). Although other factors may have played a role, cigarette smoking is a potentially controllable risk factor strongly associated with problem wounds in this series of patients. Evidence implicating smoking as a risk factor is presented and discussed.

COMMENTS: *This is a good report showing the association of smoking and impaired wound healing in intraoral surgical cases. The results suggest that smoking tobacco may have a direct biological effect on exposed tissues. (KLR)*

169. Jones, B.H, Bovee, M., Harris III, J. and Cowan, D.N. Intrinsic risk factors for exercise-related injuries among male and female Army trainees. Am J Sports Med 21(5):705-10, 1993.

ABSTRACT: Physical training-related injuries are common among army recruits and other vigorously active populations, but little is known about their causation. To identify intrinsic risk factors, we prospectively measured 391 army trainees. For 8 weeks of basic training, 124 men and 186 women (79.3%) were studied. They answered questionnaires on past activities and sports participation, and were measured for height, weight, and body fat percentage; 71% of the subjects took an initial army physical fitness test. Women had a significantly higher incidence of time-loss due to injuries than men, 44.6% compared to 29.0%. During training, more time-loss injuries occurred among the 50% of the men who were slower on the mile run, 29.0% versus 0.0%. Slower women were likewise at greater risk than faster ones. 38.2% versus 18.5%. Men with histories of inactivity and with higher body mass index were at greater injury risk than other men, as were the shortest women. We conclude that female gender and low aerobic fitness measured by run times are risk factors for training injuries in army trainees, and that other factors such as prior activity levels and stature may affect men and women differently.

170. Jones, B.H., Cowan, D.N., Tomlinson, P.J., et al. Epidemiology of injuries associated with physical training among young men in the army. Med Science Sports Exerci 25(2):197-203, 1993.

ABSTRACT: Epidemiology of injuries associated with physical training among young men in the army. It is widely acknowledged that musculoskeletal injuries occur as a result of vigorous physical activity and exercise, but little quantitative documentation exists on the incidence of or risk factors for these injuries. This study was conducted to assess the incidence, types, and risk factors for training-related injuries among young men undergoing Army infantry basic training. Prior to training we evaluated 303 men (median age 19), utilizing questionnaires and measurements of physical fitness. Subjects were followed

over 12 weeks of training. Physical training was documented on a daily basis, and injuries were ascertained by review of medical records for every trainee. We performed univariate and multivariate analyses of the data. Cumulative incidence of subjects with one or more lower extremity training-related injury was 37% (80% of all injuries). The most common injuries were muscle strains, sprains, and overuse knee conditions. A number of risk factors were identified, including: older age, smoking, previous injury (sprained ankles), low levels of previous occupational and physical activity, low frequency or running before entry into the Army, flexibility (both high and low), low physical fitness on entry, and unit training (high running mileage).

COMMENTS: *This ARIEM study was one of the first to document the higher incidence of injuries among Army soldiers who smoke. In this case the relationship stands up to multivariate analysis where physical activity is included. Almost 62% of the injuries in this population were overuse injuries. Other studies seem to indicate that smokers are more susceptible to overuse injuries. (PJA).*

171. Kandel, D.B. and Davies, M. Adult sequelae of adolescent depressive symptoms. Arch Gen Psychiatry 43(3):255-62, 1986.

ABSTRACT: We examined sequelae of depressive mood, experienced at ages 15 to 16 years, nine years later at ages 24 to 25 years in subjects formerly enrolled in New York State public high schools. Feelings of dysphoria in adolescence predict most strongly a similar experience in adulthood. Such feelings also predict psychiatric hospitalization for women but not for men, at least up to the period we investigated. In addition, adolescent depression is associated with heavy cigarette smoking, increased use of minor prescription tranquilizers (among women), more deviant activities and accidents as young adults, and selective effects on interpersonal relationships. The long-term effects of adolescent depression manifest themselves in a reduced ability to establish an intimate relationship with a member of the opposite sex rather than the ability to maintain a circle of male and female friends. The distance from spouse (or partner) repeats within the marital dyad the lack of closeness to parents experienced in adolescence. Dysphoric mood seems to be associated with a deficiency to establish close interpersonal relationships within the family that expresses itself differently at different stages of the life cycle: toward parents in adolescence, and toward spouses and parents in young adulthood.

172. Kaufman, D.W., Slone, D., Rosenberg, L., Miettinen, O.S. and Shapiro, S. Cigarette smoking and age at natural menopause. Am J Public Health 70(4):420-2, 1980.

ABSTRACT: In a cohort of 656 naturally postmenopausal women who were interviewed at age 60 to 69 years, and had reached their menopause between the ages of 35 and 59 years, the mean age at menopause declined with increasing number of cigarettes smoked, from 49.4 years of age among women who had never smoked to 47.6 years of age among women who smoked at least 15 cigarettes per day (p less than 0.02). The relationship was not attributable to the onset of menopause inducing women to take up smoking.

173. Kawachi, I., Colditz, G.A., Stampfer, M.J., et al. Smoking cessation in relation to total mortality rates in women. A prospective cohort study. Ann Intern Med 119(10):992-1000, 1993.

ABSTRACT: OBJECTIVE: To examine the temporal relationship between stopping smoking and total mortality rates among middle-aged women. DESIGN: Prospective cohort study with 12 years of follow-up. SETTING: Registered nurses residing in the United States. PARTICIPANTS: 117,001 female registered nurses, ages 30 to 55 years, who were free of manifest coronary heart disease, stroke, and cancer (except nonmelanoma skin cancer) in 1976. MAIN OUTCOME MEASURES: Total mortality, further categorized

into deaths from cardiovascular diseases, cancers, and violent deaths. RESULTS: A total of 2847 deaths (933 among never smokers, 799 among former smokers, and 1115 among current smokers) occurred during 1.37 million person-years of follow-up. The multivariate relative risks for total mortality compared with never smokers were 1.87 (95% CI, 1.65 to 2.13) for current smokers and 1.29 (CI, 1.14 to 1.46) for former smokers. Participants who started smoking before the age of 15 years had the highest risks for total mortality (multivariate relative risk, 3.15; CI, 2.16 to 4.59), cardiovascular disease mortality (relative risk, 9.94; CI, 5.15 to 19.19), and deaths from external causes of injury (relative risk, 5.39; CI, 1.84 to 15.78). Compared with continuing smokers, former smokers had a 24% reduction in risk for cardiovascular disease mortality within 2 years of quitting. The excess risks for total mortality and both cardiovascular disease and total cancer mortality among former smokers approached the level of that for never smokers after 10 to 14 years of abstinence. The health benefits of cessation were clearly present regardless of the age at starting and daily number of cigarettes smoked. CONCLUSIONS: The risk of cigarette smoking on total mortality among former smokers decreases nearly to that of never smokers 10 to 14 years after cessation.

174. Keenan, R.M., Hatsukami, D.K., Pentel, P.R., Thompson, T.N. and Grillo, M.A. Pharmacodynamic effects of cotinine in abstinent cigarette smokers. Clin Pharmacol Ther 55(5):581-90, 1994.

ABSTRACT: The nicotine metabolite cotinine was administered to abstinent cigarette smokers to determine whether it has pharmacologic activity as assessed by various physiologic and subjective measurements. By means of a randomized, double-blind, placebo-controlled counterbalanced-order design, subjects received cotinine base (30 mg) intravenously after 48 hours of abstinence from cigarette smoking. Serum cotinine concentrations increased to levels commonly achieved during daily cigarette smoking, whereas no change in serum nicotine concentration was observed. Cotinine compared with placebo produced subjective differences in self-reported ratings of restlessness, anxiety and tension, insomnia, sedation, and pleasantness. Cotinine had minimal effects on cardiovascular measurements. These findings indicate that cotinine is behaviorally active in the setting of cigarette abstinence at blood concentrations similar to those commonly achieved through daily cigarette smoking.

175. Kenney, K.K. and Quigley, N.C. Survey of tobacco use in basic trainees and armor basic course officers. Mil Med 161(January):37-42, 1996.

ABSTRACT: In this study of an all-male population of 256 U.S. Army basic trainees and 98 armor officer basic course students were surveyed concerning extent of use, knowledge of, and factors contributing to the use of smokeless tobacco (ST). The survey was administered at a dental clinic at Fort Knox, Kentucky. The data were analyzed using the SPSS computer software program. Results showed that more than 17% of this population had tried ST and more than 9% were former users. Exactly one-half had not tried ST. A typical user was white, had started ST use at age 14, had used it for 4 years and was most likely to use snuff or dip. Higher education level achieved was associated with an increased likelihood of ST use. Nearly 22% of college graduates used ST, whereas only 15.3% of high school graduates or those with some college were users. Knowledge about the potential health effects of ST was generally high or moderately high, except for its ability to cause hypertension. This was true for both high school and college graduates, although college graduates were somewhat more informed. Few in this population had a personal attitude of approval toward ST use, and very few perceived that either their parents or their superiors in the military approved of ST use. Perceived principle reasons for starting ST use were use by friends and curiosity about taste and effects. Influence from public figures, such as athletes, and from advertising was minimal. Enjoyment of flavor and taste was found to be the main reason for continued ST use. Health professionals were identified by the majority of respondents as the single most important information source on ST. Relatively few (27%), however, stated that their dentist or hygienist had ever discussed ST with them.

176. Kent, D. Passive smoking and accident compensation [letter]. N Z Med J 102(865):171, 1989.
177. Kershbaum, A., Khorsansian, R., Caplan, R.F., Bellet, S. and Feinberg, L.J. The role of catecholamines in the free fatty acid response to cigarette smoking. Circ 28:52-57, 1963.

ABSTRACT: The role of the adrenal glands and the sympathetic nervous system in the free fatty acid (FFA) rise after smoking was investigated. In 11 subjects who smoke three cigarettes per hour for a 3-hour period, urinary free catecholamine excretion increased 2.5 micrograms/hour (21 percent) and total catecholamine excretion increased 3.1 microgram/hour (16 percent). FFA elevations occurred in all subjects during the smoking periods. In three subjects, repeated control determinations of their FFA response to smoking were made and a rise was observed in each instance. Sympathetic ganglionic blockade was then induced with methaphan camphorsulfonate and the smoking tests were treated. No rise in the FFA after smoking occurred following blockade. Eight patients, who had previously undergone bilateral adrenalectomy for the treatment of hypertension, were studied for their FFA response to smoking. In six subjects there was no significant elevation. In two subjects there was a minimal effect. These findings indicate that for cigarette smoking to cause an increase in serum free fatty acids both the adrenal glands and the sympathetic nervous system must be functioning, probably to produce an effective level of circulating catecholamines.

178. Kershbaum, A. and Bellet, S. Cigarette, cigar, and pipe smoking. Some differences in biochemical effects. Geriatrics 23(3):126-34, 1968.

ABSTRACT: Epidemiological studies have shown that the increased incidence of coronary heart disease associated with cigarette smoking does not occur with cigar or pipe smoking. In previous studies, we have shown that cigarette smoking causes certain aberrations of lipid metabolism and catecholamine activity which are recognized to be contributory factors in the development of atherosclerosis. To help find an explanation for the difference in the incidence of coronary heart disease with cigar and pipe smoking as compared to cigarette smoking, we investigated possible differences in their effect on these metabolic and hormonal processes. In this report, the comparative effects of cigarette, cigar, and pipe smoking on blood lipids and catecholamine excretion will be presented, and the influence of inhaling on these effects will be shown. Studies of differences in nicotine absorption and excretion with the different smoking forms will also be discussed.

179. Kimsey, C.D., Jr. The Epidemiology of Lower Extremity Injuries in United States Marine Corps Recruits. Epidemiology and Biostatistics, School of Public Health. Chapple Hill, University of South Carolina, 1993.

ABSTRACT: This prospective study consisted of 434 male and 366 female recruits at the Marine Corps Recruit Depot, Parris Island. The purpose of this study was to document the occurrence of training-related lower extremity musculoskeletal injuries, and assess factors associated with these injuries. Subjects were followed for the 12 weeks period of basic training. The study consisted of three parts: completion of a questionnaire, collection of physical fitness tests (PFT) data, and collection of injury data from the medical record. The incidence of training-related lower extremity musculoskeletal injury was at 29.1% for males, and 45.0% females. The most frequent sites of lower extremity injury were the knee, ankle, foot, and lower leg (shin/calf). Diagnoses were indicative of the majority of injuries being of the overuse type. No specific training event could be identified as a significant source of injury for the subjects. Univariate analyses revealed IST run time (used to signify initial fitness) and cigarette smoking to have the strongest, and only statistically significant, associations with injury for males and females. Multivariate modeling results show the risk of incurring a training-related injury to be greater for male

recruits who are less physical fit (initial fitness). Cavorts contributing to the association with injury included cigarette smoking, decrease or maintained exercise prior to boot camp, and a past exercise or sports injury. Multivariate results also indicate that the risk of incurring a training-related injury will be greater in female recruits who are less physically fit (initial fitness). A history of being less physically active was not found to be a risk factor for injury in either male or female subjects.

180. Kita, T., Okamoto, M. and Nakashima, T. Nicotine-induced sensitization to ambulatory stimulant effect produced by daily administration into the ventral tegmental area and the nucleus accumbens in rats. Life Sci 50(8):583-90, 1992.

ABSTRACT: Bilateral injections of nicotine (30 micrograms/side) into the ventral segmental area (VTA) and the nucleus accumbens (NACC) increased the ambulatory activity in rats. Moreover, daily injections of nicotine (10, 20 and 30 micrograms/side) into the VTA and the NACC for 6 successive days produced sensitization to the ambulatory stimulant effect of nicotine. Sensitization produced by daily injections of nicotine (20 micrograms/side) into both the sites was maintained for withdrawal periods of 10 days. Mecamylamine (2 mg/kg, i.p.), SCH23390 (0.05 mg/kg, i.p.) and spiperone (0.1 mg/kg, i.p.) antagonized nicotine-induced sensitization to the ambulatory stimulant nicotine-induced sensitization to the ambulatory stimulant effect produced by daily injections into the VTA. These results suggest that nicotine-induced sensitization to the ambulatory stimulant effect involves the stimulation of the mesolimbic dopaminergic pathway through the nicotinic acetylcholine receptor (nAChR) in the VTA and the NACC.

181. Kivimaki, J., Riihimaki, H. and Hanninen, K. Knee disorders in carpet and floor layers and painters. Scand J Work Environ Health 18(5):310-6, 1992.

ABSTRACT: In an evaluation of the effect of kneeling work on the knees, 168 actively working carpet and floor layers and 146 house painters were examined with the aid of a questionnaire, a clinical examination, and radiography. Reported knee pain, knee accidents, and treatment regimens for the knees were more common among the carpet and floor layers than among the painters. Radiographic changes of the tibiofemoral joint were noted equally in the two occupational groups, but osteophytes of the patella were more common among the carpet and floor layers than among the painters. In a multivariate analysis, the determinants of osteophytosis of the knee were age, occupation, knee accidents, and smoking, and osteophytosis may be due to more frequent workbreaks from kneeling postures among smoking workers. This study indicates that kneeling work increases the risk of knee disorders and such radiographic changes that might be an initial sign of knee degeneration.

182. Knox, G.W. and Frable, M.A. Adventures in smoking: add oxygen [letter]. JAMA 258(10):1333, 1987.

COMMENTS: *Three patients with severe burns of the nasal mucosa were seen over a period of 18 months. The patients attempted to smoke while being administered oxygen in a hospital setting. (PJA)*

183. Kondo, K. and Tsubaki, T. Case-control studies of motor neuron disease: association with mechanical injuries. Arch Neurol 38(4):220-6, 1981.

ABSTRACT: Two case-control studies of motor neuron disease that involved 712 cases and 158 cases, respectively, showed that (1) mechanical injuries were two to three times more frequent in both sexes, heralding amyotrophic lateral sclerosis, progressive bulbar paralysis, and progressive muscular atrophy; (2) the head, neck, spine, and the extremities were more often traumatized; (3) traumatized parts were not correlated with the initial manifestation of the disease; and (4) more males were traumatized, but males still predominated among uninjured cases. These results suggested that mechanical injuries were not the cause, but probably one of the risk factors of the disease. No association was observed with smoking,

drinking, residence, home space, drinking water, animals, experience as a war prisoner, stay on Guam, parental consanguinity, measles, polio, mumps, tuberculosis, rheumatism, prosthesis of the total teeth, shell splinters retained in the body, occupational exposures to radiations, chemicals, or gases, atomic bombings, electric injuries, surgical operations, and occupations.

184. Kondo, T., Tagami, S., Yoshioka, A., Nishimura, M. and Kawakami, Y. Current smoking of elderly men reduces antioxidants in alveolar macrophages. Am J Respir Crit Care Med 149(1):178-82, 1994.

ABSTRACT: Alveolar macrophages were prepared from 15 healthy elderly male current smokers 60.9 +/- 9.9 yr of age (mean +/- SD). Alveolar macrophages from 11 elderly male non-smokers 66.7 +/- 8.1 yr of age served as controls. Production of oxygen radical species was higher in alveolar macrophages from current smokers than in those from non-smokers in the presence and absence of phorbol myristate acetate (29.8 +/- 15.5 versus 13.7 +/- 8.2 mumol/10(6) cells and 3.8 +/- 1.6 versus 2.2 +/- 1.2 mumol/10(6) cells, respectively, $p < 0.01$). Decreases in antioxidant activity were observed in cells from smokers versus those from non-smokers for Cu, Zn-superoxide dismutase (114 +/- 41 versus 210 +/- 73 units/mg protein, respectively, $p < 0.01$), glutathione S-transferase (0.217 +/- 0.091 versus 0.368 +/- 0.017 units/mg protein, $p < 0.01$), and glutathione peroxidase (0.736 +/- 0.779 versus 1.590 +/- 0.879 units/mg protein, $p < 0.05$). Immunologic estimation showed a decrease in the levels of Cu, Zn-superoxide dismutase in cells from smokers (104.3 +/- 46.4 versus 184.1 +/- 64.4 ng enzyme/mg protein, respectively, $p < 0.01$). Northern blot analysis of Cu, Zn-superoxide dismutase mRNA showed no apparent difference between the two groups, suggesting not the inactivation of this enzyme but a reduction of the translational step or increased proteolysis. The oxidant and antioxidant imbalance observed in elderly male current smokers may be a factor in the pathogenesis of respiratory tissue injury caused by smoking.

185. Kowal, N.E., Johnson, D.E., Kraemer, D.F. and Pahren, H.R. Normal levels of cadmium in diet, urine, blood, and tissues of inhabitants of the United States. J Toxicol Environ Health 5(6):995-1014, 1979.

ABSTRACT: Cd was measured in the feces, urine, blood, and hair of U.S. inhabitants without known high Cd exposure in Chicago, Illinois, and Dallas, Texas, and in autopsy tissues of accident victims in Dallas. The average intake of Cd in food was estimated to be 13-16 microgram/d and was higher for males than females. The average levels of Cd were 0.59-0.77 microgram/l in urine, 0.09-0.11 microgram per 100 ml in blood, 0.83-1.10 microgram/g in hair, 21 microgram/g in kidney cortex, 1.2 microgram/g in liver, 0.067 microgram/g in muscle, 0.58 microgram/g in pancreas, and 0.040 microgram/g in fat. Hair Cd was higher for males than females. Cd levels increased with age in urine and all tissues and were higher in cigarette smokers than non-smokers in urine, blood, and all tissues.

186. Kowal, D.M. Nature and causes of injuries in women resulting from an endurance training program. Am J Sports Med 8(4):265-9, 1980.

ABSTRACT: Women entering the Army are exposed to considerable physical stress due to the intense physical training program encountered. At the beginning of a basic training cycle, a prospective study was initiated to identify exercise-related injuries and performance-limiting conditions that resulted from an 8-week physical training program and to identify some of the factors that may contribute to their occurrence. Four hundred women recruits (age 18 to 29 years) participated in the study. All had passed initial physical examination and were without any limiting disabilities. An initial assessment of physical fitness was accomplished to determine the current status of body composition, strength of the major muscle group (e.g., legs, trunk, arms, and upper torso), aerobic capacity, previous athletic history, self-perception of physical fitness, and psychosomatic predisposition. The training and conditioning program (1 hr. daily, five to six times a week) involved a series of standard warm-up calisthenics and stretching exercises

followed by a run, beginning at 3/4 mile at a 10 min. per mile pace and increasing to 2 miles at 9 1/2 min. per mile by the end of the training. Extensive road marches and military training activities were also included. At the end of training, a self-report injury questionnaire was used to collect injury data. These data were documented with the records from the unit dispensary and data provided by the installation physical therapy, orthopedic, and podiatry clinics. Fifty-four percent (215) of the women sustained some reportable injury. These injuries resulted in an average training time loss of 13 days. Forty-one percent of these injuries prevented participation in all activity, 31% resulted in only limited participation. Early training "overuse syndrome" accounted for 42% (92) of the reports injuries. Significant injuries were: tibial stress fracture (45), chondromalacia of the patella (21) hip or neck of femur stress fracture (20), sprains (12), Achilles tendinitis (10), calcaneous or metatarsal stress fracture (8), and fascial and anterior compartment strains (6). The injury data were correlated with prior-fitness measures. The results indicated that a major cause of injury in women can be attributed to the lack of prior conditioning, greater body weight and fat percent, and limited leg strength. These factors, coupled with some inherent physiologic characteristics of women (i.e., wide pelvis, less strength, and greater joint flexibility), probably contributed to the increased risk of injury in these women. It is concluded that susceptibility to these potential orthopedic and medical conditions can be identified before the beginning of training and minimized through proper remedial activity before a strenuous physical training program is initiated.

187. Kozak, J. [Smoking behavior of workers -- occupational disability and economic sequelae. A prospective study]. Z Erkr Atmungsorgane 173(3):229-37, 1989.

ABSTRACT: A prospective study concerning the influence of smoking on duration and frequency of certified sickness absence due to illness or accident and due to respiratory diseases in particular was carried out in a production plant from 1981 to 1984. The results show, that the mean duration of sickness absence due to illness and accident during a year is not in relation to smoking habit. The frequency of sickness absence due to illness and accident as well as to respiratory disease in smokers was significantly higher (p less than 0.05) than in non-smokers. The frequency of visits of male smokers at surgery hours was assessed to be significantly higher in relation to male non-smokers; in females we found an inverted relation. Higher frequency of smokers sickness absence could be expressed in economic terms.

188. Krall, E.A., Dawson-Hughes, B., Papas, A. and Garcia, R.I. Tooth loss and skeletal bone density in healthy postmenopausal women. Osteoporos Int 4(2):104-9, 1994.

ABSTRACT: Associations between dental status and skeletal bone density were investigated in a group of 329 healthy postmenopausal women with normal bone density. Bone mineral density (BMD) of the lumbar spine, femoral neck and distal radius were measured by dual- or single-photon absorptiometry. Number of teeth remaining were counted and presence of complete dentures noted by a nurse practitioner. Forty-eight women (15%) wore a complete maxillary and/or mandibular denture: 22(7%) were completely edentulous and an additional 26 (8%) had one edentulous ridge. Among women without complete dentures ($n = 281$), significant positive linear relationships were observed between number of teeth and BMD at the spine ($p < 0.05$) and radius ($p < 0.01$), controlling for years since menopause, pack-years of smoking, education and body mass index. BMD did not differ between the groups with and without dentures. However, women who acquired dentures after the age of 40 years had significantly lower mean spinal and radial BMD than women who acquired dentures at age 40 years or earlier (at the radius, $0.584 +/- 0.015$ v $0.630 +/- 0.017$ g/cm², $p < 0.05$; at the spine, $1.043 +/- 0.031$ v $1.124 +/- 0.029$ g/cm², $p = 0.05$). In linear regression analysis, significant independent correlations were found among all women ($n = 329$) between number of teeth and age (partial $r = -0.19$, $p < 0.001$), pack-years of cigarette use (partial $r = -0.23$, $p < 0.001$) and years of education (partial $r = +0.11$, $p < 0.05$). These associations between dental status and BMD support the hypothesis that systemic bone loss may contribute to tooth loss.

189. Kreiger, N., Kelsey, J.L., Holford, T.R. and O'Connor, T. An epidemiologic study of hip fracture in postmenopausal women. Am J Epidemiol 116(1):141-8, 1982.

ABSTRACT: In this case-control study of the epidemiology of hip fracture in post-menopausal women aged 45-74 years, cases of hip fracture and two control groups were selected from admissions to four general hospitals in Connecticut between September 1977 and May 1979. Fewer cases of hip fracture than controls had been exposed to estrogen replacement therapy, and among those who had been exposed, exposure time was shorter than that for controls. The cases had breast fed their children for shorter durations, and they more often had had both ovaries removed. Also, the cases were found to weigh less than the controls. The negative associations of hip fracture with estrogen replacement therapy, intact ovaries, and weight are consistent with the hypothesis that estrogens protect against hip fracture.

190. Kunugita, N., Norimura, T. and Tsuchiya, T. [Relationship between cigarette smoking and physical complaints]. Sangyo Ika Daigaku Zasshi 15(2):137-45, 1993.

ABSTRACT: In order to evaluate the influence of cigarette smoking on health conditions, the authors analyzed results of the THI (Todai Health Index) questionnaire, which was administered to male employees of a large-sized enterprise in Osaka between 1984 and 1990. The smoking rate of male employees decreased over this period of time from 62.4% (1984) to 58.3% (1990) in this enterprise. Complaints regarding respiratory organ, digestive organ, circulatory organ, irregularity of daily life, impulsiveness, and many subjective symptoms significantly increased with the amount of smoking. Many items of physical complaints in the THI questionnaire were also associated with smoking. These were coughing, sore throat, sputum, nausea when brushing teeth, loss of appetite, stomach pain, stomach problems, diarrhea, heartburn, gum problems, bad breath, heavy eyelids, itchy skin, face looked pale, shortness of breath, palpitation, feeling flushed or feverish, back pain, going to bed late and getting up late, weakness or fatigue, irregular meals, irritation, sensitive or nervous, eating salty or greasy food, and heavy drinker. It is therefore important in the health education of individual smokers to put special emphasis not only on the many diseases associated with smoking but also these physical complaints.

191. Kyro, A., Usenius, J.P., Aarnio, M., Kunnamo, I. and Avikainen, V. Are smokers a risk group for delayed healing of tibial shaft fractures? Ann Chir Gynaecol 82(4):254-62, 1993.

ABSTRACT: A total of 135 patients with a fresh tibial shaft fracture and with no other significant injuries underwent primary conservative treatment. Data on their smoking habits were obtained from hospital records and by questionnaire. Although the smokers had better prospects for healing of the fracture at the outset than non-smokers (lower mean age and less fractures caused by high-energy injuries), the smokers were found to have a significantly longer mean time to clinical union and a higher incidence of delayed union. According to a crude calculation, smokers had a 4.1-fold risk of tibial shaft fracture caused by low-energy injury, compared with non-smokers. An accelerated failure time model showed that the more comminuted or open the fracture, the higher the number of cigarettes smoked and the older the patient, the longer was the time to clinical union of the tibial shaft fracture. Female sex appeared to be a further risk factor for delayed healing. A logit model indicated that comminution of the fracture, smoking and female sex were associated with delayed union and non-union. If a patient has a markedly raised probability of delayed union of tibial shaft fracture because of many risk factors as reported in the previous literature or in this study, operative treatment should be considered as the primary alternative instead of conservative treatment. Stopping smoking during healing of tibial shaft fracture could also promote the union of the fracture.

192. Labbate, L.A. Nicotine cessation, mania, and depression [letter] [published erratum in Am J Psychiatry Sep;149(9):1287, 1992]. Am J Psychiatry 149(5):708,

1992.

COMMENTS: *This is a short letter presenting two cases of severe mood disorder following nicotine cessation. (JAB)*

193. LaCroix, A.Z. and Omenn, G.S. Older adults and smoking. Clin Geriatr Med 8(1):69-87, 1992.

ABSTRACT: This review supports the following conclusions regarding the benefits of smoking cessation in older adults: 1. Older smokers who quit have a reduced risk of death compared with current smokers within 1 to 2 years after quitting. Their overall risk of death approaches that of those who never smoked after 15 to 20 years of abstinence. 2. Smoking cessation in older adults markedly reduces the risks of coronary events and of cardiac deaths within 1 year of quitting, and risk continues to decline more gradually for many years. This is true for older adults both with and without a previous history of coronary disease and symptoms. 3. Risks of dying from several smoking-related cancers are reduced by quitting. Although the decline in risk may be more gradual for older than middle-aged adults, the benefits of cessation are apparent within 5 to 10 years of quitting. 4. Smoking cessation reduces the risk of COPD mortality after 10 to 15 years of abstinence in men and 5 to 10 years of abstinence in women. Within a shorter period of time, quitting reduces the prevalence of respiratory symptoms, slows the rate of decline in pulmonary function, and may reduce functional impairments and improve tolerance for exercise. 5. Smoking cessation may help slow osteoporosis and reduce the risk of hip fractures, but effects on rates of bone loss or subsequent risk of fracture have not yet been studied adequately. 6. Continued smoking in late life is associated with the development and progression of several major chronic conditions, loss of mobility, and poorer physical function. Former smokers appear to have higher levels of physical function and better quality of life than continuing smokers. Physicians and others should encourage older adults to stop smoking. Of course, not every older adult who quits will benefit in all, or indeed any, of these ways. Nevertheless, at the population level, the prospects are excellent that smoking cessation after age 65 will extend both the number of years of life and the quality of life.

COMMENT: *This review paper examined previous research to determine if smoking cessation in older adults would provide any noticeable improvements in health. The overall risk of death was reduced among former smokers when compared to current smokers. A reduction in risk was also seen for coronary events and cardiac death, as well as for death from smoking-related cancers in individuals who quit smoking. Smoking cessation also reduced the risk of COPD mortality. Smoking cessation is thought to slow osteoporosis and reduce the risk of hip fractures although more research is needed in this area. Evidence suggests that smoking cessation after age 65 will both extend the number of years of life and improve the quality of life. (JAB)*

194. Lagrue, G., Branellec, A. and Lebargy, F. [Toxicology of tobacco]. Rev Prat 43(10):1203-7, 1993.

ABSTRACT: Tobacco is one of the major toxic agents in our civilization. The extent and severity of the current smoking epidemics are due to the use of industrial cigarettes: their smoke, less irritant than that of cigars and pipe, can be inhaled intensively with rapid absorption of all toxic compounds. Tobacco smoke is composed of a gas phase (CO₂, CO, CNH, etc.) and a particle phase (a very fine aerosol) in which more than 4000 substances have been identified. The main toxic compounds in tobacco are CO, nicotine and tars. CO binds to hemoglobin to form COHb, a major factor of hypoxia and vascular accidents. Within a few seconds, nicotine reaches the brain where it binds to specific receptors, which explains its psycho-active effects (psychological dependence) and the induction of physical dependence. This dual dependence is responsible for the failures and relapses observed in attempted withdrawals. Furthermore, nicotine stimulates the sympathetic system with hypersecretion of catecholamines resulting in vascular complications. Tars contain carcinogenic substances, such as aromatic hydrocarbons, which exert local

effects on the respiratory tract and systemic effects since they are absorbed by the lungs; this explains the remote neoplasias such as cancer of the bladder. Tars also contain irritant agents (acrolein, formaldehyde, etc.) and oxidative substances responsible for chronic bronchitis and emphysema. Thus, all organs and tissues can be damaged by the toxic compounds that are present in tobacco and, in particular, in tobacco smoke.

195. Lakier, J.B. Smoking and cardiovascular disease. Am J Med 93(1A):8S-12S, 1992.

ABSTRACT: Cigarette smoking is the most preventable cause of cardiovascular morbidity and mortality. Smoking has been associated with a two-to fourfold increased risk of coronary heart disease, a greater than 70% excess rate of death from coronary heart disease, and an elevated risk of sudden death. These risks are compounded in the presence of hypertension, hypercholesterolemia, glucose intolerance, and diabetes, all of which exhibit a synergistic effect with smoking. The relationship between smoking and the risk of peripheral vascular disease has also been well documented. Smokers account for approximately 70% of patients with atherosclerosis obliterans and virtually all those with thromboangiitis obliterans. An association between smoking and cerebrovascular disease remains a matter of debate, although a higher risk of stroke and stroke-related mortality has been observed in smokers than in non-smokers. Smoking has also been implicated in the development of cor pulmonale, but a direct association with congestive heart failure has not been established. Nicotine and carbon monoxide appear to play major roles in the cardiovascular effects of smoking. Both components adversely alter the myocardial oxygen supply/demand ratio and have been shown to produce endothelial injury, leading to the development of atherosclerotic plaque. Adverse effects on the lipid profile have been noted as well, but the relationship between these changes and the risk of cardiovascular disease remains to be confirmed. Notably, smoking cessation results in a dramatic reduction in the risk of mortality from both coronary heart disease and stroke. In light of the fact that the incidence of smoking has declined primarily among educated sectors of the U.S. population, future efforts must focus on providing effective education, including smoking cessation techniques, to the less-educated groups.

196. Langslow, A. Good intentions may go up in smoke. Aust Nurses J 14(10):52-3, 61, 1985.

197. Lannan, S., McLean, A., Drost, E., et al. Changes in neutrophil morphology and morphometry following exposure to cigarette smoke. Int J Exp Pathol 73(2):183-91, 1992.

ABSTRACT: Acute cigarette smoking delays neutrophils within the pulmonary circulation in some smokers. Evidence from an in-vitro Micropore filter model of the pulmonary capillaries indicates that this may be due to a smoke induced decrease in cell deformability. In order to determine whether changes in cell shape are associated with the observed decrease in neutrophil deformability following smoke exposure, cell morphology, using scanning electron microscopy, and morphometric measurements, made using transmission electron microscopy, were performed on aliquots of neutrophils harvested from whole blood in non-smoking subjects before and after exposure in vitro to cigarette smoke. Smoke exposure increased the maximum diameter and circumference of neutrophils, without changing their area. There was also a change in the maximum to minimum cell diameter ratio, which indicated that the cells had become less spherical. Scanning electron microscopy showed that smoke exposed cells had developed blebbing of their surface membranes, suggestive of an oxidative injury to the cell membrane rather than the shape changes associated with cell activation. These changes in the morphology and morphometry of smoke exposed neutrophils may contribute to the reduction in cell deformability induced by cigarette smoke.

198. Lannerstad, O., Isacsson, S.O. and Lindell, S.E. Risk factors for premature death in men 56-60 years old. A prospective study of men born 1914, living in Malmö, Sweden. Scand J Soc Med 7(1):41-7, 1979.

ABSTRACT: In a five-year follow-up of a random sample of men aged 55 the association between risk factors and premature death was analyzed. The overall mortality in five years was 5.8%. The mortality among the smokers was 8%; among non-smokers 2%. Of 16 cancer deaths all were smokers except one who was an ex-smoker. In spite of treatment of hypertension (greater than 165/110 mmHg) there was an association between high blood pressure and premature death, particularly when cause of death was cardiovascular disease. There was no association between premature death and serum cholesterol, serum triglycerides or physical activity. The study is based on 703 men, of whom 41 died. The autopsy frequency was 93%. Only 3 men (0.4%) were lost to follow-up.

199. Lapidus, L., Bengtsson, C., Hallstrom, T. and Björntorp, P. Obesity, adipose tissue distribution and health in women -- results from a population study in Gothenburg, Sweden. Appetite 13(1):25-35, 1989.

ABSTRACT: The associations between generalized obesity measured as body mass index (BMI), or adipose tissue distribution, measured as the waist/hip circumference ratio (WHR), on one hand, and a number of socioeconomic, somatic as well as psychologic and mental health variables on the other, were analyzed in a population study of women (1462 participants, aged 38-60 years, participation rate 90.1%). The anthropometric measurements were adjusted for their influence on each other. BMI, but not WHR, was negatively associated with socioeconomic status and education. Increased WHR correlated to a number of somatic diseases from different organ systems, including diabetes mellitus, infectious respiratory and abdominal diseases. Even more striking were strong correlations to a number of variables indicating accident proneness as well as mental disorder, and increased use of antidepressants and tranquilizers. BMI and WHR were also associated to different personality profiles. Furthermore, the use of alcohol and smoking were positively correlated to the WHR. In contrast, most of these associations were not seen with the BMI--sometimes even negative correlations were found. Exceptions were, however, varicose veins, joint problems and surgery for gall bladder disease, which were positively correlated to BMI only. Blood pressure, plasma triglycerides and uric acid were positively correlated to both BMI and the WHR, plasma cholesterol, however, only to the WHR. Obesity (high BMI) and abdominal adipose tissue distribution (high WHR) clearly show differences in their associations to various health variables. It is hypothesized that an arousal syndrome might be a contributing factor to cause symptoms of psychological maladjustment, including psychosomatic disease. Hypothetically, in parallel, an accumulation of depot fat in the abdominal depot, might follow as a consequence of neuroendocrine dysregulation of endocrine secretions.

200. Laroche, M., Lasne, Y., Felez, A., et al. [Osteocalcin and smoking]. Rev Rhum Ed Fr 61(6):433-6, 1994.

ABSTRACT: Smoking is a risk factor for osteoporosis. Nicotine and nonnicotine tobacco smoke components have been shown to depress osteoblast activity in a number of in vitro and animal studies. To determine whether smoking is associated with depressed osteoblast activity in humans, we measured serum osteocalcin levels (using a radioimmunological method based on an antibody to human osteocalcin) in 24 male or female smokers and 24 matched non-smokers. Overall, osteocalcin levels were significantly lower in smokers (15 +/- 6.95 ng/ml) than in non-smokers (21.27 +/- 8.34 ng/ml) ($p = 0.007$). The difference between smokers and non-smokers was significant in males (15.3 +/- 4.5 vs 23.27 +/- 9.7; $p = 0.02$) but not in females (16.27 +/- 8.9 vs 19.45 +/- 6.7; $p = 0.2$). These data suggest that smoking may induce osteoblast depression, either directly or via hormonal changes.

201. Larsen, P.E. Alveolar osteitis after surgical removal of impacted mandibular third molars. Identification of the patient at risk. Oral Surg Oral Med Oral Pathol 73(4):393-7, 1992.

ABSTRACT: One hundred thirty-eight impacted mandibular third molars were surgically removed. A prospective study of risk factors associated with the development of alveolar osteitis (dry socket) postoperatively was undertaken. Two surgeons, one experienced and one inexperienced, removed the teeth. Patients were controlled for age, sex, use of oral contraceptives, radiographic difficulty of the extraction, and tobacco use. Patients treated by the inexperienced surgeon and those using tobacco had a significantly greater incidence of alveolar osteitis. Previously identified risk factors of increased age, female sex, oral contraceptive use, and increased surgical time were not associated with an increased incidence of dry socket. Recommendations are made regarding prevention of alveolar osteitis in those patients identified as being at high risk.

202. Larson, C.P. and Pless, I.B. Risk factors for injury in a 3-year-old birth cohort. Am J Dis Child 142(10):1052-7, 1988.

ABSTRACT: The purpose of this study was to identify factors associated with injuries in the first three years of life and to assess their predictive utility. The parents of 918 children (82% of an eligible birth cohort) completed a telephone interview to document injury histories. The occurrence of injury was then linked to previously obtained information characterizing early childhood. Several determinant associations were found for injuries seen by a physician and for those requiring treatment. Maternal factors (single, unemployed, smoking) were dominant in both instances. From these factors, logistic regression models were developed from which adjusted relative risk estimates were derived. The presence of all three maternal factors, as well as the absence of a younger sibling, increases the probability of an injury from 20% to over 60%. These findings may be used to assist in the development of preventive programs by targeting children at increased risk. They also provide a basis for further studies that will permit a better understanding of the causal mechanisms linking maternal factors to preschool injury.

203. LaVecchia, C., Negri, E., Levi, F. and Baron, J.A. Cigarette smoking, body mass and other risk factors for fractures of the hip in women. Int J Epidemiol 20:671-7, 1991.

ABSTRACT: Determinates of hip fractures were assessed using data from a network of hospital based case-control studies from northern Italy. For the present analysis, cases were 208 women with fractures of the hip proximal femur (aged 28-74, median age 62) admitted to a network of teaching and general hospitals in the greater Milan area, controls were 3229 women, aged 25-74 (median age 65), admitted for non-traumatic acute conditions to the same network of hospitals. There was a strong direct association with smoking, the relative risk (RR) being significantly and similarly elevated in ex- and in current smokers (RR 1.7 and 1.5 respectively) which rose to 2.4 for 25 or over cigarettes per day. The risk was associated with duration of smoking and apparently greater in post-menopausal women. Two factors showed significant inverse associations with hip fractures; relative weight, with relative risks of 0.5, 0.4 and 0.3. In subsequent categories of body mass indexes compared with thinner ones, and the use of oestrogen replacement treatment (multi-variant RR = 0.4, 95% confidence interval (CI): 0.2-1.1). No association was observed with education or social class, selected indicator foods or alcohol consumption (RR for the highest consumption level = 1.0). The effects of smoking and body mass index appeared independent: compared with never smoking heavier women, the RR for smoking thin women was 4.6. Thus, this case-control study of hip fractures in a predominately post-menopausal population of women showed a strong association with smoking and appreciable protection from heavier body mass index and the use of oestrogen replacement treatment.

204. Law, M.D., Jr. and Stein, R.E. Late infection in healed fractures after open reduction and internal fixation. Orthop Rev 22(5):545-52, 1993.

ABSTRACT: Nine patients with normal fracture healing after open reduction and internal fixation presented with late infection 15 months to 19 years after injury. Eight of the nine patients had a history of pain at the fracture site for 3 weeks or longer. Elevated temperature and white blood cell count were unreliable indicators of infection. Six patients had an elevated erythrocyte sedimentation rate that correlated with osteomyelitis. Roentgenograms showed resorption around the implant in seven patients and a small nidus in two patients. There was a change in position of fixation screws in four patients. Cigarette smoking and alcoholism were the most common systemic risk factors. Local risk factors were open fracture, lower-extremity site, distal femur site, and chronic edema of the lower extremities. Late infection should be included in the differential diagnosis of patients presenting with new-onset pain and a retained orthopedic implant. Patients who fall into this group may be at increased risk for development of late hematogenous infection of orthopedic implants.

205. Lee, P.N. Has the mortality of male doctors improved with the reductions in their cigarette smoking? BMJ 2(6204):1538-40, 1979.

ABSTRACT: From 1951 to 1971 male doctors reduced their cigarette smoking more than did men in social classes I and II combined. In 1970-2, 665 male doctors died aged under 65. Had they shown the same improvements in cause-specific death rates over the 20 years as men in classes I and II, 699 deaths would have been expected. This saving of 34 deaths in the doctors comprised savings from coronary heart disease (83), stroke (16), and lung cancer (8) balanced by 60 losses from three stress-related causes--namely, accident, poisonings, etc (30); suicide (26); and cirrhosis of the liver (4)--plus 13 from other causes. As a relative reduction in mortality from heart disease in doctors (as compared with that in social classes I and II) also occurred during 1931-51--that is, before they began to give up smoking--some of the saving in heart-disease deaths in 1951-71 was probably not related to changes in smoking habits. The relative worsening in mortality from stress-related diseases may have been due partly to a possible adverse effect of giving up smoking if smoking had acted to reduce stress. From these findings, the benefits of giving up smoking may not be so great as has commonly been assumed.

206. Lee, S., Raker, T. and Chisick, M., C. Psychosocial factors influencing smokeless tobacco use by teen-age military dependents. Mil Med 159(2):112-117, 1994.

ABSTRACT: Using bivariate and logistic regression analysis, we explored psychosocial correlates of smokeless tobacco (SLT) use in a sample of 2,257 teenage military dependents. We built separate regression models for males and females to explain triers and users of SLT. SLT was additionally associated with race, difficulty in purchasing SLT, relatives who smoke, current smoking, and belief that SLT can cause mouth cancer. Male use of SLT was associated with race, seeing a dentist regularly, SLT counseling by dentist, parental approval, trying and current smoking, and grade level. In all models, trying smoking was the strongest explanatory variable. Relatives and peers exert considerable influence on SLT use. Few triers or users had received SLT counseling from their dentist despite high dental utilization rates.

207. Lehr, H.A., Kress, E., Menger, M.D., et al. Cigarette smoke elicits leukocyte adhesion to endothelium in hamsters: inhibition by CuZn-SOD. Free Radic Biol Med 14(6):573-81, 1993.

ABSTRACT: Although cigarette smoking has been identified as a major risk factor for cardiovascular diseases, the underlying pathomechanism is largely unknown. Using a dorsal skinfold chamber model in

Syrian golden hamsters for intravital microscopy on striated muscle microcirculation, we investigated whether cigarette smoke (CS) affects the adhesion of circulating leukocytes to the endothelium, a constant feature of early atherogenesis and a hallmark of ischemia-reperfusion injury. Awake hamsters were exposed for 5 min to the mainstream smoke of one cigarette (2R1 research cigarette), inducing nicotine, cotinine, and carboxyhemoglobin plasma levels comparable to levels found in human smokers. In control animals (n = 7), CS exposure elicited the rolling and subsequent adhesion of fluorescently stained leukocytes to the endothelium of arterioles and postcapillary venules. Leukocyte/endothelium interaction was preceded by an early rise in xanthine oxidase activity and intravascular hemolysis. Leukocyte adhesion and xanthine oxidase (XO) activation were significantly attenuated in hamsters pretreated with superoxide dismutase (5 mg/kg, 10 min prior to CS, n = 7), suggesting a key role of superoxide in this event. These *in vivo* results suggest a novel pathomechanism of CS-induced cardiovascular pathology.

208. Levin, E.D., Briggs, S.J., Christopher, N.C. and Rose, J.E. Persistence of chronic nicotine-induced cognitive facilitation. *Behav Neural Biol* 58(2):152-8, 1992.

ABSTRACT: Nicotine has been found in a variety of species and behavioral paradigms to improve memory performance. The beneficial effect of nicotine has been seen after both acute and chronic administration. Interestingly, improved performance has been seen 24 h after acute injection and for at least 2 weeks after chronic administration. However, it is not clear from previous studies whether the persistence of the improved performance represents a true carryover of the drug effect or is due to the behavioral experience while under nicotine's effect. The current study was conducted to determine whether the facilitating effect of nicotine on learning and memory performance could be seen after withdrawal even if there was no behavioral training during the period of chronic nicotine administration. Rats were administered nicotine chronically for 3 weeks but were not tested during that time. Starting 1 week after withdrawal they were trained on a working memory paradigm in an eight-arm radial maze. The nicotine-treated rats started out at control-like levels of performance, but showed significantly faster learning as detected by three different measures of choice accuracy. By the final phase of testing the control subjects had caught up with the nicotine-treated rats. After the acquisition phase, acute challenges with the nicotinic and muscarinic antagonists, mecamylamine and scopolamine, did not elicit any differential effects in the nicotine-treated and control groups. The current study demonstrated that nicotine-induced cognitive facilitation persists for at least 4 weeks after withdrawal and does not depend upon behavioral test experience under the influence of the drug. The mechanism for this persisting effect is not currently understood.(ABSTRACT TRUNCATED AT 250 WORDS)

209. Liddell, F.D. Motor vehicle accidents (1973-6) in a cohort of Montreal drivers. *J Epidemiol Community Health* 36(2):140-5, 1982.

ABSTRACT: In 1973-4 nearly 10 000 Montreal drivers, interviewed by telephone, provided information about medical and associated factors and about driving habits, in particular annual mileage. Records of accidents suffered by these drivers in the Province of Quebec over 39 months (1973-6) were also collected. The 7634 current drivers, with appropriate permits, and all of whose data passed reliability edits, were placed into nine sets—that is, three classes: women; men with the usual permit; and men with a chauffeur's permit to drive taxis, heavy vehicles, etc; further subdivided into three age groups. Accident rates depended on mileage, but after allowance for differences in mileage, accident rates still varied with sex, type of permit, and age. No association of the risk of accidents and a medical or related factor was consistent over all nine sets of drivers. Of the 7634 drivers, 347 had had at least one accident causing injury or death in the 39 months from 1 January 1973. These cases were compared with 347 referents, closely matched for sex, type of permit, age, and reported mileage, but without accident causing injury or death. Cases included higher proportion who worked irregular shifts, who were overweight, and who reported smoking while driving. Relative to the chance of a referent suffering any accident in the 39-month period, a case had at least double the risk of having an accident in addition to the index accident.

COMMENT: *This study began as a cohort study in which 18,328 subjects were identified. About one third of the subjects were lost because telephone numbers could not be obtained for various reasons. Of the 9799 subjects who gave some response 6665 completed questionnaires while 3134 gave some information which was not considered reliable. The actual cohort studied consisted of 7634 current drivers whose questionnaires were complete or nearly so and about whom there were no identity doubts, but excluded the small proportion permitted to drive only motorcycles, mopeds, farm tractors, snowmobiles or "other" vehicles. Of these 7634 drivers 347 had at least one accident causing injury or death during the 39-month study period. These 347 drivers were used in a separate nested case-control analysis. For each case a control was selected who was the same sex and age and who reported the same mileage per year and type of permit. Subsequent analysis revealed that cases were slightly less likely to report seat belt use than controls. Cases, in particular men, were also more likely to report smoking while driving. In addition for case-control pairs in which both the case and control worked the cases were more likely to work irregular shifts than the controls. The authors do not have a hypothesis to explain the relationship between smoking and accidents but suggest that this relationship may be confounded by alcohol. Smokers are probably also more likely to be drinkers. However, no relationship was found between self-reported drinking levels and accidents in this study. The question on smoking asked specifically about smoking while driving which may suggest distraction during driving which may lead to accidents. (JAB)*

210. Lin, S.J., Hong, C.Y., Chang, M.S., Chiang, B.N. and Chien, S. Long-term nicotine exposure increases aortic endothelial cell death and enhances transendothelial macromolecular transport in rats. Arterioscler Thromb 12(11):1305-12, 1992.

ABSTRACT: Repeated endothelial cell injury has been suggested as an initiating factor in atherogenesis. Dying or dead endothelial cells have been shown to make significant contributions to the local enhancement of transendothelial macromolecular transport. Since cigarette smoking is one of the major risk factors for atherosclerosis, we examined the hypothesis that smoking accelerates atherogenesis by increasing the frequency of endothelial cell death and hence transendothelial macromolecular transport. Sixteen male Sprague-Dawley rats were given nicotine at a weight-adjusted dose of 5 mg/kg body wt per day in their drinking water over a period of 6 weeks. A group of 16 age-matched male Sprague-Dawley rats not exposed to nicotine and maintained over the same time period served as the control group. In en face preparations of thoracic aorta, immunoglobulin G-containing dying or dead endothelial cells were identified by the indirect immunoperoxidase method, and endothelial leakage to Evans blue-albumin (EBA) complexes (5 minutes after intravenous injection) was visualized by fluorescence microscopy. The results showed that in nicotine-treated rats, 51% of dead endothelial cells were associated with EBA leakage, which was responsible for 57% of total EBA leaky foci. Both the frequency of endothelial cell death (0.94 +/- 0.11% versus 0.40 +/- 0.04%, p < 0.0001 by two-tailed, unpaired Student's t test) and the number density of EBA leaky foci (6.45 +/- 1.23/mm² versus 3.30 +/- 0.49/mm², p < 0.05 by two-tailed, unpaired t test) were significantly greater in nicotine-treated rats than in control rats. (ABSTRACT TRUNCATED AT 250 WORDS)

211. Liu, Y.Y., Schmeltz, I. and Hoffmann, D. Chemical studies on tobacco smoke. Quantitative analysis of hydrazine in tobacco and cigarette smoke. Anal Chem 46(7):885-9, 1974.

ABSTRACT: Hydrazine (H) is trapped from tobacco smoke by reaction with pentafluorobenzaldehyde. The formation of decafluorobenzaldehyde azine (DFBA) prevents the loss of H by artificial reaction with other smoke constituents. DFBA is enriched by chromatography and subsequently determined by gas

chromatography with FID and ECD (detection limit for H, 0.1, ng/cig). From the mainstream and sidestream smoke of a popular U.S. nonfilter cigarette were isolated 31.5 and 94.2 ng of H, respectively. The tobacco of the cigarette contained 30 ng of H. The widely used sucker growth inhibitor maleic hydrazide contains trace impurities of H and with it contributes to H in tobacco and tobacco smoke. More detailed studies are needed for the identification of the major precursor of H in tobacco smoke. This communication reports the first identification of hydrazine in a nonoccupational respiratory environment.

212. Locker, D. Smoking and oral health in older adults. Can J Public Health 83(6):429-32, 1992.

ABSTRACT: This paper examines the relationship between smoking and oral health in older adults. The data are taken from a cross-sectional study of oral health and treatment needs among persons aged 50 years and over living independently in four Ontario communities. Data were obtained from 907 subjects. Half of these reported a history of smoking and one fifth were current smokers. Current smokers were more likely to have lost all their natural teeth than those who had never smoked. Among those retaining one or more natural teeth, current smokers had fewer teeth, fewer functional units, more crown surfaces with decay and more decayed root surfaces. Periodontal indicators showed that the extent and severity of periodontal disease were more marked among current smokers when compared with those who had never smoked. Current smokers also showed a higher prevalence of mucosal disorders and needed more dental treatment. Regression analysis suggested that the links between smoking and oral disorders differ according to the disease in question.

213. Locker, D. and Leake, J.L. Risk indicators and risk markers for periodontal disease experience in older adults living independently in Ontario, Canada. J Dent Res 72(1):9-17, 1993.

ABSTRACT: This study examined risk indicators and risk markers for periodontal disease experience in 624 adults aged 50 years and over living independently in four communities in Ontario, Canada. The data were collected as part of the baseline phase of a longitudinal study of the oral health and treatment needs of this population. Periodontal disease experience was assessed in terms of attachment loss, measured at two sites on each remaining tooth. Bivariate and multivariate analyses were used to examine the relationship between a number of sociodemographic, general health, psychosocial, and oral health variables and three indicators of periodontal disease experience. These were: mean attachment loss, the proportion of sites examined with loss of 2 mm or more, and the probability of the subjects having severe disease, arbitrarily defined as a mean attachment loss in the upper 20th percentile of the distribution. Mean attachment loss was 2.95 mm (SD = 1.41 mm), and 76.6% of sites examined had loss of 2 mm or more. In bivariate analyses, the most consistent predictors of periodontal disease experience were: age, education, income, smoking, dental visiting, the number of remaining teeth, the number of decayed coronal surfaces, and the number of decayed root surfaces. In multivariate analyses, age, education, current smoking status, and the number of teeth had the most consistent independent effects. These data confirm the results of recent US studies indicating that periodontal disease experience is influenced by social and behavioral factors.

214. Locker, D. and Leake, J.L. Coronal and root decay experience in older adults in Ontario, Canada. J Public Health Dent 53(3):158-64, 1993.

ABSTRACT: This paper describes the coronal and root caries experience of subjects aged 50 years and older living in four communities in Ontario, Canada. The data were obtained as part of a comprehensive epidemiologic study of the oral health and treatment needs of this population. Caries experience was defined as the number of decayed and filled coronal and root surfaces per subject. Of 907 subjects interviewed and clinically examined, 78.3 percent were dentate and retained a mean of 18.9 teeth. The

mean number of coronal decayed and filled surfaces was 23.9; 95.6 percent of subjects had at least one coronal DFS. The mean number of decayed and filled root surfaces was 3.6; 70.9 percent had at least one root DFS. The percent D/DFS was 3.5 for coronal and 20.0 for root caries. In linear regression analysis the number of teeth, making regular preventive visits, being born in Canada, and educational status emerged as predictors of coronal DFS. Predictors of root DFS were the number of surfaces with recession, the number of coronal DFS, the number of teeth, age, sex, and smoking status. These variables accounted for 42 percent and 35 percent of the variance in the number of coronal and root DFS, respectively.

215. Luepker, R.V. and Smith, M.L. Mortality in unionized truck drivers. J Occup Med 20(10):677-82, 1978.

ABSTRACT: To determine occupational mortality in the Central States Teamster population, all death certificates for a three-month period in 1976 were collected and coded. With the exception of respiratory tract cancer and motor vehicle accident deaths, mortality rates were lower than those found in the U.S. population and comparable to those found in other employed populations. It was not possible to separate the effect of cigarette smoking from environmental exposure to explain the excess respiratory tract cancer death. Unexpectedly, the majority of accident mortalities occurred away from work rather than at work.

216. Luria, S.M. and McKay, C.L. Visual processes of smokers and non-smokers at different ages. Arch Environ Health 34(6):449-54, 1979.

ABSTRACT: Forty smokers and forty non-smokers were matched for age over the range from 21 to 76 yr. The battery of tests included: optometric refraction for near vision, scotopic sensitivity, simple and choice reaction time, visually evoked cortical potentials to targets flashing at 1 and 16 times/sec, EEG, and a perimetric test of color detection. Roughly the same number of smokers and non-smokers required spectacle corrections, but smokers tended to require more plus correction. The mean scotopic sensitivity of the smokers was significantly worse than that of the non-smokers. Reaction time tended to be poorer for the smokers. There were no differences on the perimetry test and in the EEGs of the smokers and non-smokers, and no significant changes in the visually evoked responses to either 1 or 16 flashes/sec. There was virtually no evidence of an increasing difference between the smokers and non-smokers with increasing age.

COMMENTS: *While the authors found that the mean scotopic sensitivity of smokers was significantly worse than that of the non-smokers, and reaction time tended to be poorer for smokers, there was no evidence of an increasing difference between the smokers and non-smokers with increasing age. This is an interesting finding with many possible explanations -- many of which were discussed by the authors. This finding is perhaps even more remarkable in that there are significant effects on young smokers. This may be one of the factors which distinguishes the role of smoking in injury vs. illness. In the case of injury, only a relatively brief exposure to tobacco is necessary, whereas a person can smoke for decades before succumbing to some cancers. Perhaps this fact should be stressed in our appeals to convince young people not to start or continue smoking -- especially soldiers whose lives depend on top performance. (PJA)*

217. MacMahon, B., Trichopoulos, D., Cole, P. and Brown, J. Cigarette smoking and urinary estrogens. N Engl J Med 307(17):1062-5, 1982.

218. Makela, M., Heliovaara, M., Sievers, K., et al. Prevalence, determinants, and consequences of chronic neck pain in Finland. Am J Epidemiol 134(11):1356-67, 1991.

ABSTRACT: Chronic neck pain is a relatively mild musculoskeletal condition, but common enough to be a

possible public health problem. The distribution, determinants, and consequences of chronic neck pain have hitherto been described inadequately. In the Mini-Finland Health Survey, a representative population sample of 8,000 Finns aged greater than or equal to 30 years was invited to participate in a comprehensive health examination comprising an interview and a clinical examination; 90.2% complied. Predetermined criteria were used to diagnose major cardiovascular, musculoskeletal, respiratory, mental, and other disorders, regardless of other simultaneous disorders. Chronic neck syndrome was diagnosed in 9.5% of the men and 13.5% of the women. When adjusted for age and sex, the prevalence of the neck syndrome was associated with a history of injury to the back, neck, or shoulder and with mental and physical stress at work. Among those aged 30 to 64 years, overweight and parity were also significant determinants. Other musculoskeletal and mental disorders were associated with neck syndrome, and the association persisted after working conditions, injuries, overweight, and parity were adjusted for. There was some independent association between neck syndrome and disabilities, use of physician services, and use of pain killers.

219. Maletzky, B.M. and Klotter, J. Smoking and alcoholism. Am J Psychiatry 131(4):445-7, 1974.

ABSTRACT: The authors interviewed 57 hospitalized alcoholic and 50 nonhospitalized control subjects to clarify the relationship between alcoholism and cigarette smoking. They found that alcoholics smoked significantly more than non-alcoholics, even when only women subjects were considered. In addition, there was a high positive correlation between the amount alcoholics drank and the amount they smoked. However, when they were abstaining from alcohol consumption, alcoholic subjects did not necessarily smoke more. The authors discuss the implications of these findings both for treatment and for two theoretical models, oral "drive" and susceptibility.

220. Malmivaara, A., Heliovaara, M., Knekt, P., Reunanen, A. and Aromaa, A. Risk factors for injurious falls leading to hospitalization or death in a cohort of 19,500 adults. Am J Epidemiol 138(6):384-94, 1993.

ABSTRACT: Falls are the most common cause of nonfatal injuries and a major cause of injury death. In order to identify risk factors for injuries from falls, 19,518 persons aged 20-92 years from four regions of Finland were examined and followed up from between 1973 and 1977 to 1984 for 8 to 11 years by identifying hospital admissions or deaths due to fall injuries. During 187,405 person-years, 628 injuries from falls were documented. The risk for injuries from falls was significantly and independently of other factors associated with alcohol intake in all age and sex groups. After adjustment for all the other risk determinants, the relative risks (RR) (95% confidence intervals (CI)) in persons with monthly ethanol intake of 100-499 g, 500-999 g, and > or = 1,000 g were 1.43 (1.13-1.82), 2.32 (1.71-3.17), and 3.05 (2.05-4.55), respectively, compared with abstainers. Body mass index (kg/m²) > or = 30 was associated with an increased risk among women aged < 45 years (RR = 2.8, 95% CI 1.28-5.89), whereas in persons aged > or = 65 years it seemed to be a protective factor both among men (RR = 0.3, 95% CI 0.06-1.19) and women (RR = 0.5, 95% CI 0.30-0.76). Also single marital status, smoking, heavy physical activity during leisure time, use of psychopharmacologic agents, diabetes mellitus, and cardiovascular diseases other than stroke were found to carry independent predictive significance in at least one subgroup of sex and age. In conclusion, alcohol consumption, relative weight, and use of psychopharmacologic agents were seen to be the most relevant risk determinants. Intervention trials based on the predictive factors and on high-risk groups are needed.

COMMENTS: *This study finds that for one specific type of injury, falls, smokers are between 19% and 69% more likely to be injured. There appeared to be an increasing effect with increasing number of cigarettes smoked. The authors do not attempt to explain their findings of increased injuries among smokers. (PJA)*

221. Mäkelä, M., Heliövaara, M., Sievers, K., et al. Prevalence, Determinants, and Consequences of Chronic Neck Pain in Finland. American Journal of Epidemiology 134:1356-1367, 1991.

ABSTRACT: Chronic neck pain is a relatively mild musculoskeletal condition, but common enough to be a possible public health problem. The distribution, determinants, and consequences of chronic neck pain have hitherto been described inadequately. In the Mini-Finland Health Survey, a representative population sample of 8,000 Finns aged ≥ 30 years was invited to participate in a comprehensive health examination comprising an interview and a clinical examination; 90.2% complied. Predetermined criteria were used to diagnose major cardiovascular, musculoskeletal, repertory, mental and other disorders, regardless of other simultaneous disorders. Chronic neck syndrome was diagnosed in 9.5% of the men and 13.5% of the women. When adjusted for age and sex, the prevalence of the neck syndrome was associated with a history of injury to the back, neck, or shoulder and with mental and physical stress at work. Among those ages 30 to 64 years, overweight and parity were also significant determinants. Other association persisted after working conditions, injuries, overweight, and parity were adjusted for. There were some independent association between neck syndrome and disabilities.

222. McCullock, R.G., Whitting, S.J., Bailey, D.A. and Houston, C.S. The effect of cigarette smoking on trabecular bone density in premenopausal women, aged 20-35 years. Can J Public Health 82:434-435, 1991.

COMMENTS: One hundred Caucasian female volunteers were enrolled in this study to evaluate the relationship between smoking and premenopausal trabecular bone density. Subjects were divided into three smoking categories: nonsmoker (0 pack-years), moderate smoker (1-10 pack-years) and heavy smoker (> 10 pack-years). Heavy smokers were shown to have decreased bone density in crude analysis, but there was no significant difference between moderate smokers and nonsmokers. Regression analysis, controlling for age and BMI, resulted in a negative slope. Thus greater number of pack-years was associated with decreased bone density when controlling for age and BMI. (JAB)

223. McCusker, K. Mechanisms of respiratory tissue injury from cigarette smoking. Am J Med 93(1A):18S-21S, 1992.

ABSTRACT: Cigarette smoking can be viewed as a chronic inflammatory disorder of the lower airways. Two of the major lung injuries that can result are chronic bronchitis and emphysema. Chronic bronchitis is characterized by chronic mucus hypersecretion and cough; emphysema is a destructive process of the alveolar spaces. Tissue injury may result from the actions of degradative enzymes derived from such inflammatory cells as neutrophils and monocytes. In addition, oxidative injury from inflammatory cells and from oxidants in smoke may participate in the pathogenesis of these smoking-related illnesses.

224. McFarland, R.A. The effects of exposure to small quantities of carbon monoxide on vision. Ann N Y Acad Sci 174:301-12, 1970.

225. McFarland, R.A. Low level exposure to carbon monoxide and driving performance. Arch Environ Health 27(6):355-9, 1973.

ABSTRACT: Subjects were exposed to low levels (700 ppm) of carbon monoxide (CO) until carboxyhemoglobin (COHb) levels of 6%, 11%, and 17% were reached, and they were then tested as to their ability to perform both selected driving related laboratory tests of visual response and control reactions and over-the-road vehicle driving. These test results were then compared with those on the same subjects taken under control conditions without exposure to CO. The overall pattern of results

indicates that a 6% COHb level had no effect on driving ability, and that COHb levels of 11% and 17% did not appear to seriously affect the ability to drive motor vehicles, as measured by the tests administered in this study. However, certain statistically significant differences were found in some of the tests that suggest some decrement in performance as a result of CO exposure.

COMMENTS: *There are many difficulties in performing and interpreting the results of a study such as this. Nonetheless, these results lend some evidence that CO, by itself, may not be the most important contributor to increased risk of injury among smokers. (PJA)*

226. McGinnis, J., Shopland, D. and Brown, C. Tobacco and health: Trends in smoking and smokeless tobacco consumption in the United States. Ann Rev Public Health 8:441-467, 1987.

COMMENTS: *Statistics on smoking and smokeless tobacco use from 1960s through 1980s. (JAB)*

227. McGuire, F. Smoking, driver ed. and other correlates of accidents among young males. Journal of Safety Research 4, 1972.

228. McGuire, A. Cigarettes and fire deaths. N Y State J Med 83(13):1296-8, 1983.

COMMENTS: *The author provides an overview of fire deaths associated with smoking and some interesting history on the fire-safe cigarette. (PJA)*

229. McLaughlin, W.S., Lovat, F.M., Macgregor, I.D. and Kelly, P.J. The immediate effects of smoking on gingival fluid flow. J Clin Periodontal 20(6):448-51, 1993.

ABSTRACT: The aim of the present study was to examine the immediate effect of smoking a cigarette on gingival crevice fluid (GCF) flow-rate. The study involved 17 healthy volunteers (6 male, 11 female) aged 19-57 years (mean 34.5 years) who regularly smoked cigarettes. All were periodontally healthy. GCF was collected at the mesio-buccal aspects of the right and left maxillary 2nd premolar teeth, using filter-paper strips left in place for 3 min. Samples were taken at baseline and subsequently at 10 min intervals for 70 min. Each subject sham smoked an unlit standard cigarette for 7 min after the 20 min recording, and smoked the same cigarette for 7 min to within 1 cm of the filter, following the 40 min recording. The results showed that following sham smoking (30 min recording) GCF volume increased by a mean of 16.7% ($p = 0.057$), and following smoking (50 min recording) GCF volume increased by a mean of 89.7%, over the previous recording ($p < 0.0001$). The increase following smoking was greater than that following sham smoking ($p < 0.0001$). Flow-rate returned to near resting levels within the experimental period. The results indicate that smoking produces a marked transient increase in GCF flow-rate, which might reflect changes in blood flow known to be produced by nicotine.

230. Mechanic, D. and Cleary, P.D. Factors associated with the maintenance of positive health behavior. Prev Med 9(6):805-14, 1980.

ABSTRACT: Various factors associated with positive health behavior-- an index based on eight measures of health response such as seat belt use, smoking, exercise and risk-taking--were examined. Women had more positive scores than men, reflecting a higher level of drinking and risk-taking among men, and a lower level of preventive medical behavior. Other predictors include education and a conventional behavioral orientation. Positive health behavior is associated with both psychological well-being and subjective health status. The patterns of associations found support the hypothesis that positive health behavior is part of a complex life-style that may reflect the ability to anticipate problems, mobilize to meet

them, and cope actively.

COMMENTS: *Smoking was found to be related to drinking, non-use of seat belts, a lack of preventive medical behavior, and a lack of exercise. The study also found that persons reporting poorer health status were less likely to use seatbelts, more likely to smoke, sought less preventive care, and were less physically active. The study also evaluated psychological distress symptoms indicating anxiety and depression and found that smoking, as well as drinking, not using seat belts and less physical activity were related to psychological distress. These findings may point to a complex life-style that may make individuals more susceptible to negative health outcomes including both injury and illness. (JAB)*

231. Mecklenburg, R.E., Greenspan, D. and Kleinman, D.V. Tobacco Effects in the Mouth: Guide for Health Professionals. National Cancer Institute and National Institute of Dental Research, Bethesda, MD, Report NIH 93-3330, 1992.

ABSTRACT: Tobacco use compromises your patients' medical and dental care and presents serious threats to their health and well-being and to the health and well-being of their families, associates, and community. The development of potentially life-threatening oral lesions is one of the may results of tobacco use. An oral examination designed to detect oral mucosal lesions, whether tobacco related or not, is an essential element of every medical or dental assessment. Prompt recognition and treatment of lesions may avert future morbidity and mortality. Routine mucosal tissue examination during the course of periodic examinations may detect oral cancer and precancerous lesions in time to improve prognosis significantly. This report is divided into three main parts: 1-A description and illustrated guide of tobacco-induced and associated conditions. 2-A description of the multiple, insidious effects that tobacco use has on clinical care. 3-A description of a systematic method for conducting an oral examination and documenting one's findings. This report discusses potential mechanisms for the delayed wound healing seen in smokers. Nicotine is a peripheral vasoconstrictor that affects oral tissues as well as the extremities, internal organs, and reproductive processes. Carbon monoxide and other products of burning may also contribute to reduced capillary blood flow in the mouth. A 50 percent to 100 percent inhibition of polymorphonuclear leukocyte (PMN) activity in gingival tissues has been observed in smokers, due mainly to a lack of motility. Decreased chemotactic ability and phagocytic capacity may also occur. Thus, the prognosis for some dental therapies (e.g., periodontal, oral surgery) may not be as favorable as for comparable nonusers.

232. Metts, A. The Relationship Between Work Injuries and Smoking Habits Among a Group of Cotton Textile Workers. Dissertation, University of Oklahoma, Oklahoma City, 1981.

233. Mizuno, T., Nakagaki, H., Murakami, T., et al. [Lifestyles related to preserving 20 or more teeth at 80 years of age]. Nippon Koshu Eisei Zasshi 40(3):189-95, 1993.

ABSTRACT: To explore lifestyle factors related to preserving 20 or more teeth at 80 years of age, a total of 114 Japanese persons aged 80 years old (70 with 20 teeth or more (mean teeth: 25.0 +/- 2.8) and 44 with 19 teeth or less (mean teeth: 5.2 +/- 6.3)) were studied. Study subjects received a dental examination and were directly interviewed, using a questionnaire, to collect such information as past episodes of tooth and gingival conditions, past attitude to dental care and several lifestyle habits. The following major findings emerged by statistical analysis. Probability of preserving 20 or more teeth at 80 years of age was significantly high with: (1) strict upbringing in childhood ($p < 0.05$ in males), (2) no swollen gums around 60 years old ($p < 0.01$ in males), (3) early visit to a dentist around 40 years old ($p < 0.05$ in males), and (4) not being fond of sweets in childhood ($p < 0.05$ in females). The following related to a high tendency toward preserving 20 or more teeth at 80 years of age: (1) graduate from primary school only (in females), (2) having a home dentist around 20 years old (in males), (3) tended to visit a dentist earlier at 20 years old (in

males), (4) not eating sweet things at 60 years old (in males), and (5) have not smoked cigarettes (in males). (ABSTRACT TRUNCATED AT 250 WORDS)

234. Moon, J., Bandy, B. and Davison, A.J. Hypothesis: etiology of atherosclerosis and osteoporosis: are imbalances in the calciferol endocrine system implicated? J Am Coll Nutr 11(5):567-83, 1992.

ABSTRACT: Atherosclerosis and osteoporosis are currently considered unrelated diseases. Osteoporosis involves bone calcium (Ca) loss and predominantly affects females after menopause. Atherosclerosis is an illness predominantly affecting males, and is primarily characterized by abnormal lipid metabolism. However, pathological calcification of the arterial wall is an underlying feature of atherosclerosis. Ca homeostasis is thus important in atherosclerosis as well as in osteoporosis. Men also develop osteoporosis although at a later age than women, and, as osteoporosis progresses in women, there is an accompanying calcification of arteries leading to increased incidence of atherosclerosis in aging women. Thus, during old age, both atherosclerosis and osteoporosis are prevalent in both males and females. The dramatic increase in atherosclerosis among women as they develop osteoporosis suggests that the two illnesses may be more closely related than previously realized. The use of vitamin D as a food supplement coincides with epidemic onsets of atherosclerosis and osteoporosis, and excess vitamin D induces both conditions in humans and laboratory animals. These observations suggest a role for chronic vitamin D excess in the etiology of the two illnesses. Magnesium (Mg) deficiency, nicotine, and high dietary cholesterol are contributing factors that accentuate adverse effects of vitamin D.

235. Moseley, L.H., Finseth, F. and Goody, M. Nicotine and its effect on wound healing. Plastic and Reconstructive Surgery 61:570-5, 1978.

ABSTRACT: This study demonstrated that nicotine impaired wound contraction in the rabbit ear model from the 4th to the 10th day of wound healing. However, the wounds contracted at essentially the same rate from the 12th to the 20th day in the experimental and control groups of animals. This study would suggest that cigarette smoking, with its associated nicotine ingestion, is adverse for a time to wound healing. It is clearly possible that in cases of extremity injury, or surgery, cigarette smoking may adversely affect wound healing. Further studies of the inflammatory events, collagen synthesis during the inflammatory phase of wound healing, blood flow, and the myofibroblast are needed.

COMMENTS: *This study is important because it links nicotine to impaired wound healing. This may be a biological mechanism for the effects of smoking tobacco on the wound healing process.* (KLR)

237. Mudr, D., Naus, A., Engler, V., Hetychova, M. and Vavreckova, O. Work injuries and smoking. Industrial Medicine and Surgery 35:880-1, 1966.

COMMENTS: This study was conducted in a machine works in Czechoslovakia. Fifteen hundred men and women were monitored for a 10 month period. All injured persons were asked to complete a questionnaire which included details of the source and cause of the accident and their smoking habits. Among the smokers, injuries were registered among 31% of the men and 19% of the women. Among the non-smokers, the rates were 25% and 9% respectively. This article was brief and simple in its presentation, but may serve to illustrate the magnitude of smoking's effect on morbidity among factory workers. (PJA)

238. Muto, T. and Sakurai, H. [Relationship of smoking to absenteeism due to illness and injury in male workers]. Nippon Koshu Eisei Zasshi 39(7):387-98, 1992.

ABSTRACT: The relationship between smoking and absenteeism due to illness and injury was studied in

21,924 male workers employed in the chemical fiber industry in Japan. Smokers had a significantly higher incidence of absence than non-smokers. The proportion of cases of absence in smokers was 30% higher and the number of days of absence was 28% greater than in non-smokers. Ex-smokers also had a significantly higher incidence of absence than non-smokers. In ex-smokers the proportion of cases of absence was 22% higher and the number of days of absence was 68% greater than in non-smokers. Although there was no significant difference between smokers and non-smokers in the number of days of absence attributed to cardiovascular or respiratory diseases, smokers were absent for about twice as many days as non-smokers for diseases of the digestive system. For ex-smokers the number of days of absence was 4.3 times higher for cardiovascular diseases, 1.5 times higher for respiratory diseases, and 2.9 times higher for digestive system diseases than in non-smokers. After correction for age, type of work, Body Mass Index, exercise, and drinking by multiple logistic analysis significantly elevated relative risks for absence persisted both in smokers and ex-smokers vs. non-smokers at 1.4 and 1.3, respectively. Significant dose-response relationships between incidence of absence and the number of cigarettes smoked per day were observed in respiratory disease, diseases of the digestive system and all disease causes. A significant dose-response relationship between incidence of absence and smoking index was also observed for diseases of the digestive system. These findings clearly indicate that smoking by workers was associated with absence due to illness and injury, and suggest that smoking was a factor contributing to an increase in absenteeism due to illness and injury in workers.

239. Muto, T. and Sakurai, H. Relation between exercise and absenteeism due to illness and injury in manufacturing companies in Japan. J Occup Med 35(10):995-9, 1993.

ABSTRACT: The relation between exercise and absenteeism due to illness and injury was assessed in 21,924 male workers. Exercisers I (engaging in exercise less than once a week), II (once or twice a week), and III (more than three times a week) had a significantly lower incidence of absence than nonexercisers. The proportion of cases of absence in exercisers I, II, and III was 10%, 10%, and 14% lower, respectively, than that of nonexercisers. The number of days absent among exercisers I, II, and III was 48%, 43%, and 26% lower, respectively, than among nonexercisers. Controlling for confounding factors by logistic analysis, significantly reduced relative risk of absence persisted among exercisers I, II, and III versus nonexercisers at 0.88, 0.90, and 0.87, respectively. These findings indicate that worker exercise was associated with absence due to illness and injury.

COMMENTS: *This study found that smoking status was correlated with exercise status. Nonexercisers had the highest percentage of smokers (60.6%), whereas the most frequent exercise group had the lowest percentage (48.2%). (JAB)*

240. Myaer, R.E. and Treat, J.R. Psychological, social, and cognitive characteristics of high risk drivers: A pilot study. Accident Anal and Prev 9:1-8, 1978.
241. Nachemson, A.L. Low back pain - its etiology and treatment. Clin Med 78:18-24, 1971.
242. Naus, A., Engler, V., Hetychova, M. and Vavreckova, O. Work injuries and smoking. Ind Med Surg 35(10):880-1, 1966.
243. Nelson, M.D., Nevitt, M.C., Scott, J.C., Stone, K.L., and Cummings, S.R. Smoking, alcohol, and neuromuscular and physical function of older women. JAMA 272:1825-1831, 1994.

ABSTRACT: OBJECTIVE: To determine the associations of current and lifetime smoking and alcohol use with physical function in an older population. DESIGN: Survey. SETTING: Four clinic centers in the United States. PARTICIPANTS: A Total of 9704 community-dwelling, ambulatory white women 65 years or older recruited from four areas of the United States. MAIN OUTCOME MEASURES: Twelve performance tests of muscle strength, agility and coordination, gait and balance, and self-reported functional status. RESULTS: Compared with women who never smoked, current smokers had significantly poorer function on all of the performance measures except grip strength after adjusting for age, history of stroke, body mass index, clinic site, physical activity, and alcohol use ($P < .05$). This decrease in function was 50% to 100% as great as that associated with a 5-year increases in age, and most measures worsened with increasing numbers of pack-years. Compared with current moderate drinkers, nondrinkers had significantly poorer function on all of the performance measures except tandem walk ($P < .05$). Evaluation of a dose effect with alcohol was limited by a small number of heavy drinkers in the study. CONCLUSIONS: In this population, women who currently smoke are weaker and have poorer balance and poorer performance on measures of integrated physical function than non-smokers. Smoking is associated with a decline in physical function compared with non-drinkers, but associations of function with heavy drinkers could not be assessed.

244. Nelson, D.E., Emont, S.L., Brackbill, R.M., et al. Cigarette Smoking Prevalence by Occupation in the United States. *J Occupat Med* 36(5):516-525, 1994.

ABSTRACT: We analyzed data from 1987 to 1990 National Health Interview Surveys and compared them with 1978 to 1980 National Health Interview Surveys data to determine changes in cigarette smoking prevalence by occupation. During this period, cigarette smoking prevalence declined from 31.7% to 24.2% among white-collar workers, from 43.7% to 39.2% among blue-collar workers, and from 37.2% to 34.5% among service workers. For occupational groups, the largest significant declines in smoking prevalence occurred among male sales workers (10.5 percentage points), female and male managers and administrators (9.9 and 8.7 percentage points), female professional and technical workers (8.0 percentage points), and male transportation equipment operatives (7.5 percentage points). Analyses of 1987 to 1990 detailed occupation codes revealed that roofers (57.8%) and crane and tower operators (57.6%) had the highest prevalences of cigarette smoking, whereas physicians (5.4%) and clergy (6.5%) had the lowest smoking prevalences. Since 1978 to 1980, the differences in smoking prevalence by occupation have widened, providing further evidence that smoking has moved from a relatively common behavior practiced by most segments of society to one that has become more concentrated among selected subpopulations. Health professionals need to play an important role in encouraging smoking cessation among workers and in advising management and labor about the benefits of strong work-site policies.

COMMENTS: *The finding that blue-collar workers and, in particular, roofers and crane operators have the highest prevalence of smoking may have implications for research on smoking and injuries. These occupations have more risk for injury than physicians and clergy who have the lowest prevalence of smoking. It may be that people who tend to smoke are risk-takers and therefore work in higher risk occupations. However, educational and other socioeconomic factors can not be overlooked. On the other hand, it may be that because smokers tend to be employed in more physically demanding and risky occupations that there appears to be an association between smoking and injury when really one does not exist. (JAB)*

245. Nersessian, A.K. and Arutyunyan, R.M. The comparative clastogenic activity of mainstream tobacco smoke from cigarettes widely consumed in Armenia. *Mutat Res* 321(1-2):89-92, 1994.

ABSTRACT: Whole-body exposure of male albino Swiss mice to the mainstream smoke produced by 10

types of cigarettes widely consumed in Armenia resulted in a significant increase (2.4-5.6-fold) of the number of micronucleated bone marrow polychromatic erythrocytes. The smoke produced by cigarettes manufactured in Armenia, Russia and Bulgaria was more clastogenic than the smoke produced by cigarettes manufactured in the USA. A high direct correlation was observed between the number of micronucleated polychromatic erythrocytes and the content of tar and nicotine.

246. Nikodijevic, O., Jacobson, K.A. and Daly, J.W. Locomotor activity in mice during chronic treatment with caffeine and withdrawal [published erratum appears in *Pharmacol Biochem Behav* Aug;45(4):1003, 1993]. *Pharmacol Biochem Behav* 44(1):199-216, 1993.

ABSTRACT: Chronic ingestion of caffeine by mice caused a marked reduction in locomotor exploratory activity. At least 4 days of withdrawal were required to restore activity to normal levels. Stimulatory effects of injected caffeine were lower in chronically treated mice and the biphasic dose-response (stimulatory followed by depressant) curve for injected caffeine was left shifted. Seven days of withdrawal were required before the dose-response curve to caffeine was identical to that of control mice. The depressant effects of a potent xanthine phosphodiesterase inhibitor, 1,3-dipropyl-7-methylxanthine, were blunted in caffeine-treated mice. The depressant effects of A1- and A2-selective adenosine analogs were enhanced after chronic caffeine. There was little or no effect of chronic caffeine on the stimulatory effects of dopaminergic agents (amphetamine, caffeine), while both depressant and stimulatory effects of cholinergic agents (nicotine, oxotremorine, scopolamine) were reduced. The results indicate that chronic caffeine affects functions of adenosine and cholinergic receptors related to regulation of locomotor exploratory activity.

247. Noronha-Dutra, A.A., Epperlein, M.M. and Woolf, N. Effect of cigarette smoking on cultured human endothelial cells. *Cardiovasc Res* 27(5):774-8, 1993.

ABSTRACT: OBJECTIVE: The aim was to investigate whether the morphological changes previously described in endothelium exposed to cigarette smoke are linked with the oxidative burden imposed on the cells. METHODS: Cultured human umbilical vein endothelial cells (HUVEC) were exposed to samples of plasma taken from volunteer smokers and to samples of plasma to which small doses of fresh cigarette smoke derived from a smoking machine had been added. Measurements of the pentose phosphate pathway and the extruded total glutathione (GSSG) were performed to assess the presence and degree of oxidative stress on cells. Angiotensin converting enzyme (ACE) release into the medium and the ATP content of the cells were used to assess early membrane damage and cytotoxicity. RESULTS: Treatment of endothelial cells with plasma exposed to cigarette smoke in vitro resulted in activation of the pentose phosphate pathway of glucose metabolism, increased extrusion of glutathione from the cells into the medium, a decrease in the ATP pool, and release of ACE from the cells into the medium. Plasma taken from volunteers immediately after smoking showed, as might be expected, similar but less marked changes in the release of glutathione and ACE. CONCLUSIONS: Plasma from human volunteer smokers or human plasma exposed to cigarette smoke in vitro produced injury in HUVEC as assessed by changes in the ATP pool and ACE release. The extrusion of glutathione from the cells and the activation of the hexose monophosphate shunt, which is necessary to keep glutathione in the reduced state, is indicative of oxidative stress. These findings support the view that cigarette smoke related endothelial injury is, at least in part, mediated by the oxidative burden imposed by the free radicals present in cigarette smoke.

248. O'Connor, F.G. and Marlowe, S.S. Low back pain in military basic trainees. A pilot study. *Spine* 18(10):1351-4, 1993.

ABSTRACT: Many studies have been done to elucidate risk factors for low back pain in the general population. A review of the literature reveals that no studies have described low back pain in the military.

A pilot study was performed to evaluate the incidence, prevalence, and risk factors of low back pain in a group of military basic trainees. We found an incidence of 17%. Of numerous demographic and risk factors studied, only cigarette use was significantly associated with low back pain. A previous history of chronic low back pain was not significantly associated with low back pain during training but was predictive of difficulty completing training. The authors conclude that low back pain occurs frequently during Army basic training and that cigarette smoking is associated with increased risk.

249. Oleckno, W.A. Drinking, smoking and other factors in the epidemiology of unintentional nonmotor vehicle injuries. Public Health 101(1):39-47, 1987.

ABSTRACT: A case control study was conducted to assess the role of drinking, cigarette smoking, racial status and employment status in the epidemiology of unintentional nonmotor vehicle injuries (UNVIs). Cases consisted of 213 randomly selected injury patients admitted to one of four community hospitals in Northern Illinois between 1975 and 1983. Cases were frequency matched by age and sex to 656 community controls. Drinkers and smokers were found to be at significantly increased risk of UNVIs (OR = 3.16, 95% CI = 2.33-4.48; and OR = 3.04, 95% CI = 2.2-4.18, respectively). Non-whites and employed subjects, 15-19 years of age, were at also at increased risk of UNVIs. The unadjusted odds ratio for non-whites was 3.68 (95% CI = 2.25-5.99) and that for employed versus unemployed persons, 15-19 years old, ranged from 7.50 to 56.14 (95% CI = 0.81-68.72 and 7.39-428.38, respectively) depending on sex.

COMMENTS: *This study provides further evidence of a primary role of smoking in injury risk, independent of alcohol consumption. The age range of the population, 15-44, is similar to that of the active Army. It is interesting that the authors report non-white race as a risk factor for UNVIs, which is generally opposite to the findings of the USARIEM Occupational Medicine Division on several studies of Army soldiers. They also found a paradoxical employment effect which could have relevance to Army populations where full employment is a given. (PJA)*

250. Orleans, C.T. and Slade, J., Eds. Nicotine Addiction: Principles and Management. Oxford University Press, New York, 1993.

COMMENTS: *This book covers the etiology, epidemiology, and complications of nicotine addiction; the medical management of nicotine addiction; and public health and prevention efforts for specific populations. While no discussion of a role for nicotine in injury risk is postulated, a good discussion of the pharmacology of nicotine is provided. (PJA)*

251. Owlet, B.L., Romeder, J.M. and Lance, J.M. Premature mortality attributable to smoking and hazardous drinking in Canada. Am J Epidemiol 109(4):451-63, 1979.

ABSTRACT: All causes of death related to the two risk factors, smoking and hazardous drinking, have been reviewed followed by a selection of those causes of death for which the causal role of the risk factor appears to be quasi-certain. For each cause, existing epidemiologic data were reviewed and used to determine the fraction of premature mortality which could be attributed to each factor (called the attributable fraction). This fraction was then multiplied by the corresponding Canadian premature mortality measured in terms of deaths between ages one and 70 and potential years of life lost (PYLL) between ages one and 70, which gives a higher weight to younger deaths. Of the 73,440 deaths between ages one and 70 in Canada in 1974, 12% (or 8718 deaths) were found to be attributable to current smoking and 6% (4716) to hazardous drinking. In terms of PYLL between ages one and 70, hazardous drinking ranks ahead of current smoking with 10% (or 132,044 PYLL) of the total PYLL, whereas current smoking represents 8% (105,085 PYLL) of the total. Regardless of whether premature mortality is expressed in terms of deaths or PYLL, about 18% of Canadian premature mortality is attributable to current smoking

and/or drinking (with the range of possible values being 14-22%).

252. Owen, B.D. and Damron, C.F. Personal characteristics and back injury among hospital nursing personnel. Res Nurs Health 7(4):305-13, 1984.

ABSTRACT: Since back injury is the largest workman's compensation claim in most industries, the relationship between selected personal characteristics and back injury in hospital nursing personnel were studied. The sample included 64 female nursing personnel, half back injured and half not. Demographic: Workers were more likely to be back injured if they were older, worked longer on nursing units requiring frequent lifting, had family members with back problems, and had family members whose back problems began at an early age. Physical: The back injured had less muscle flexibility, less keen proprioception, and greater unequal leg length. Life style: Back injured were more vulnerable to frustration and stress overload (overstimulation), smoked more cigarettes, spent fewer hours exercising, and rated their physical condition lower. The variables with the greatest discriminatory power to predict back injury were a sense of overload, muscle flexibility, proprioception, family history of back problems, difference in leg length, years of risk in nursing practice, and smoking.

COMMENTS: *This study found that the noninjured smoked an average of 13 cigarettes per day while the injured smoked an average of 23 cigarettes per day. The injured group also scored higher in vulnerability to the stressors of overload and frustration. These two findings may hint at the relationship between smoking and the ability to deal with stress. Smokers may tend to be individuals who do not deal with stress well. This may in turn put them at higher risk for injury. (JAB)*

253. Paffenbarger, R.S., Jr., King, S.H. and Wing, A.L. Chronic disease in former college students. Characteristics in youth that predispose to suicide and accidental death in later life. Am J Public Health Nations Health 59(6):900-8, 1969.

ABSTRACT: College medical and other records of former students from two universities were examined for characteristics predisposing to suicide and accidental death in a 17-51 year follow-up period. Similarities and contrasts in these two types of unnatural death were demonstrated in terms of familial, social, and psychological characteristics. The data were interpreted to signify anxiety in the future suicide and irresponsibility in the future accident decedent.

COMMENTS: *Cigarette smoking during college was identified as a risk factor for both suicide and accident in later life. Psychological traits such as insomnia, being particularly self-conscious and being subject to periods of alternating gloom and cheerfulness were also found to be predictive of future suicide. The three most significant social characteristics found for both suicide and accident were attendance at boarding school for secondary education, cigarette smoking at time of college and failure to finish college. The authors suggest that this signifies an attitude of depression or despair in the future suicide, but a care-free or irresponsible outlook in the eventual accident victim. It is unclear how such a distinction can be made. Perhaps both results can be related to how individualism -- particularly smokers -- perceive and deal with stress. (JAB)*

254. Paganini-Hill, A., Ross, R.K., Gerkins, V.R., et al. Menopausal estrogen therapy and hip fractures. Ann Intern Med 95:28-31, 1981.

ABSTRACT: The association between menopausal estrogen therapy and hip fracture was studied in a retirement community. Ninety-one hip fracture cases during a 5-year period in female residents under age 80 were compared to age-and-race-matched community controls. Estrogen use was recorded from the medical records of the outpatient care facility and personal interviews. The estimated risk ratio for use of oral estrogen in excess of 60 months was 0.42. This protective effect was largely limited to

oophorectomized women for whom the risk ratio for a comparable duration of use was 0.14; the risk significantly decreased with increase duration, but no such trend existed with increased dosage. Diabetes mellitus, low Quetelet's index, tallness, prolonged immobilization or physical inactivity, use of corticosteroids, early age at menopause, low levels of sunlight exposure, and heavy cigarette smoking were each independent risk factors for hip fracture but none confounded the observed association with estrogen use.

255. Paganini-Hill, A., Chao, A., Ross, R.K. and Henderson, B.E. Exercise and other factors in the prevention of hip fracture: The Leisure World Study. Epidemiology 2:16-25, 1991.

ABSTRACT: As part of a prospective study begun in 1981, we evaluated 8,600 postmenopausal women and 5,049 men residing in a southern California retirement community for risk factors for hip fracture. Incidence rates were twice as high in women as in men, but in both sexes the rates nearly doubled every 5 years between 70 and 90 years. Active exercise was strongly and negatively associated with hip fracture risk in both sexes; the age-adjusted relative risk was 0.6 and 0.5 for females and males, respectively, for 1 or more hours of exercise per day compared with less than 1/2 hour of exercise. A high body mass index (upper terile of weight divided by height squared) was associated with a strong reduction in hip fracture risk for females (RR = 0.5). Current cigarette smokers had a significantly increased risk (RR = 1.8 and RR = 2.2 for females and males respectively) compared with never-smokers, but the risk for past smokers was not different from that of lifetime non-smokers. Other factors related to reduced hip fracture risk in women were high parity, late age at menarche, and long menstrual cycle length. These age-adjusted relative risk estimates did not change materially in multivariate analysis when adjusted simultaneously for age, active exercise, body mass, smoking, and, for women, age at while users who had stopped estrogen use 15 or more years ago had a relative risk of 1.1, suggesting that the protective effect of estrogen dissipates after many years since cessation of estrogen therapy.

256. Parks, J.G., Noguchi, T.T. and Klatt, E.C. The epidemiology of fatal burn injuries. J Forensic Sci 34(2):399-406, 1989.

ABSTRACT: The paper retrospectively reviews 80 burn fatalities from accidents or attempted suicides with patients admitted to the LAC-USC Medical Center from 1983 to 1987 to determine demographic factors, etiology of the burn injury, and existence of predisposing risk factors. The average age of fatal burn victims was 44 years; 74% were males, 39% were Caucasian, 35% were black, 21% were Hispanic, and 5% were of Asian descent. Blacks and Caucasians were overrepresented and Hispanics underrepresented in relation to all autopsy cases. Major etiologic factors included suicide, falling asleep while smoking, accidents while working with volatile solvents, house fires, scalds, cooking accidents, and accidents involving motor vehicles. Gasoline was the commonest solvent involved with burn fatalities. Significant risk factors for burn fatality were substance abuse (25% of cases) and impaired mental function (19% of cases).

257. Parrott, A.C. Cigarette smoking: effects upon self-rated stress and arousal over the day. Addict Behav 18(4):389-95, 1993.

ABSTRACT: Feelings of stress and arousal were assessed over a day of cigarette smoking. Smokers reported heightened stress prior to smoking, and reduced stress immediately after smoking ($p < .002$). Feelings of arousal were also significantly affected by cigarette use, with lower arousal prior to smoking, and increased arousal postsmoking ($p < .011$). This pattern was found with both sedative and stimulant smokers, as defined by the Smoking Motive Questionnaire (SMQ). These findings demonstrate that smoking can simultaneously produce both increased arousal and decreased stress. They lend doubt to the arousal modulation theory, which states that smoking leads either to reduced stress, or to increased

arousal, but not both together. The present data broadly replicated some earlier findings (O'Neill & Parrott, 1992), and confirmed that smokers experience vacillating feelings of stress and arousal over the day. Thus, while feeling-state improvements often accompany cigarette smoking, they are followed by negative feelings (during nicotine withdrawal), which are alleviated by the next cigarette. These feeling-state changes also provide a clear psychological rationale for the repetitive/addictive nature of tobacco use.

258. Parrott, A. Does cigarette smoking increase stress? [comment]. Addiction 89(2):142-4; 144-6, 1994.

259. Patrick, D.L., Cheadle, A., Thompson, D.C., et al. The validity of self-reported smoking: A review and meta-analysis. Am J Public Health 84:1086-1093, 1994.

ABSTRACT: Objectives: The purpose of this study was to identify circumstances in which biochemical assessments of smoking produce systematically higher or lower estimates of smoking than self-reports. A secondary aim was to evaluate different statistical approaches to analyzing variation in validity estimates. Methods: Literature searches and personal inquiries identified 26 published reports containing 51 comparisons between self-reported behavior and biochemical measures. The sensitivity and specificity of self-reports of smoking were calculated for each study as measures of accuracy. Results: Sensitivity ranged from 6% to 100% (mean = 87.5%), and specificity ranged from 33% to 100% (mean = 89.2%). Interviewer-administered questionnaires, observational studies, reports by adults, and biochemical validation with cotinine-plasma were associated with higher estimates of sensitivity and specificity. Conclusions: Self-reports of smoking are accurate in most studies. To improve accuracy, biochemical assessment, preferably with cotinine-plasma, should be considered in intervention studies and student populations. (Am J Public Health. 1994;84:1086-1093)

260. Payne, T.J., Smith, P.O., McCracken, L.M., McSherry, W.C. and Antony, M.M. Assessing nicotine dependence: a comparison of the Fagerstrom Tolerance Questionnaire (FTQ) with the Fagerstrom Test for Nicotine Dependence (FTND) in a clinical sample. Addict Behav 19(3):307-17, 1994.

ABSTRACT: A recent effort to improve the psychometric properties of the Fagerstrom Tolerance Questionnaire (FTQ) resulted in the revised Fagerstrom Test for Nicotine Dependence (FTND). We endeavored to replicate and extend findings suggesting the superiority of the FTND by examining the psychometric properties of both instruments, as well as their relationship to self-report and biochemical variables associated with nicotine dependence in 110 smoking clinic participants. Results verified that the FTND represents a modest improvement over the FTQ, however, the need for continued development of self-report measures of nicotine dependence is noted.

261. Peacock, M.E., Sutherland, D.E., Schuster, G.S., et al. The effect of nicotine on reproduction and attachment of human gingival fibroblasts in vitro. J Periodontal 64(7):658-65, 1993.

ABSTRACT: The ability of fibroblasts to reproduce and attach to teeth is of paramount importance in re-establishing the lost connective tissue attachment after periodontal therapy. This study examined the effect of nicotine, a major component of the particulate phase of tobacco smoke, on human gingival fibroblast (HGF) reproduction and attachment to tissue culture surfaces. Pooled HGF cultures made from explants of gingival biopsies were utilized between passages 5 and 10 and plated in 96-well plates at 1.0 x 10(4) cells per well. Cell numbers were determined using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT), which is a reflection of mitochondrial dehydrogenase activity. The concentrations of nicotine used were 0.025, 0.05, 0.1, 0.2, and 0.4 microM, the average serum

concentration for a smoker being approximately 0.1 microM. The effect of continuous nicotine exposure on HGF reproduction was determined by incubating cell cultures and media containing nicotine for up to 48 hours. Residual toxicity was determined by preincubating cells with nicotine for 1 or 6 hours. HGF suspensions and increasing concentrations of nicotine were added together to determine the effect on attachment. Results showed an enhanced effect of nicotine on HGF attachment, with increasing numbers of cells attaching with increasing nicotine concentrations, compared to the control. Low concentrations of nicotine had a stimulatory effect on cell replication, while higher concentrations of nicotine appear to have no significant effect on HGF reproduction. The responses of cells to some concentrations of nicotine may persist after its removal.

262. Pechacek, T.F., Murray, D.M., Luepker, M.B., et al. Measurement of adolescent smoking behavior: rationale and methods. J Behav Med 7:123-140, 1984.

ABSTRACT: The initiation of cigarette smoking among adolescents is a health problem which has been the subject of discussion and study for many years. The evaluation of strategies to deter the adoption of smoking has long been hampered by the problems of measuring adolescent smoking behavior. Recently, interest has increased in biochemical measures of smoking under the assumption that they are more objective measures. The validity of this assumption is addressed for several ages of adolescents. This paper presents saliva thiocyanate levels, expired air carbon monoxide levels, and smoking self reports from a sample of 2200 junior and senior high school students. Interrelationships among the biochemical and behavioral measures are strong among the total population, ranging from 0.48 to 0.95 (Pearson r) but are much weaker at younger age levels. Normative levels of carbon monoxide and saliva thiocyanate are presented by age (11-13, 14-15, and 16-17 years old). These data indicate that habitual smoking appears to develop in a gradual fashion and that several years may pass between initial experimentation and adult levels of smoking. Younger students consistently display lower levels of thiocyanate and carbon monoxide than older students of the same self-reported levels of smoking, suggesting that inhalation patterns may vary as a function of age or years of smoking.

COMMENTS: *Since many of the studies in the literature use self-reported data about smoking, it is worth considering the reliability of this data -- especially among adolescents in whom the variation may be greatest. (PJA)*

263. Peeke, S.C. and Peeke, H.V. Attention, memory, and cigarette smoking. Psychopharmacology 84:205-16, 1984.

ABSTRACT: Four experiments tested the effects of smoking one cigarette on verbal memory and attention. In Experiment I, 18 men were tested under three conditions in a repeated-measures design (pretrial smoking, posttrial smoking, no smoking). Recall of a 50-word list was tested immediately and after intervals of 10 and 45 min. Pretrial smoking resulted in improved recall 10 and 45 min after learning, but not immediately. Posttrial smoking was ineffectual. In Experiment II, three posttrial smoking intervals (1, 5, and 30 min after presentation of a 20-word list) were compared with pretrial smoking and no smoking using a between-subjects design. The 76 light, moderate, and heavy smokers in Experiment II smoked a 1.38 mg nicotine cigarette and were tested 24 h later. Improved recall occurred for pretrial smoking, but not for any posttrial smoking interval and for light and moderate smokers only. Experiment III compared a low (0.40 mg) and high (1.38 mg) level of nicotine cigarette in light and heavy smokers using pretrial smoking. The high-nicotine cigarette resulted in improved recall for both immediate- and delayed-recall tests. The low-nicotine cigarette was less effective. Light and heavy smokers differed in effect of smoking on heart rate, but not in effect of smoking on recall. Experiment IV found no effect of smoking on depth of processing. The possible mechanisms by which nicotine affects recall are discussed.

264. Perez-Stable, E.J., Marin, B.V. and Marin, G. Apparent underreporting of

cigarette consumption among Mexican American smokers. Am J Public Health 80:1057-61, 1990.

ABSTRACT: To determine the accuracy of self-report of cigarette consumption among Mexican American smokers, we compared self-reported cigarette use and serum cotinine concentrations in a sample of 547 participants in the Hispanic Health and Nutrition Examination Survey (HHANES). We defined underreporting of cigarette use as a cotinine to cigarette-per day ratio of $>0.142 \text{ M}/1$ which represented a substantial discrepancy between self-reported consumption and serum cotinine. Of the 98 men and 97 women who reported smoking one to nine cigarettes/day, 20.4 percent and 24.7 percent, respectively, underreported their cigarette consumption. Underreporting was less common among men and women smoking 10 to 19 cigarettes/day (8.3 percent and 10.8 percent, respectively) and 20 or more cigarettes/day (2.2 percent and 2.9 percent, respectively). Comparison of underreports and to other smokers by demographic characteristics within sex and cigarettes/day categories showed no differences. Differences in cotinine metabolism and extremely efficient smoking are alternative explanations that can not be ruled out with these data. We believe, however, that a proportion of Mexican American light smokers may underreport the quantity of cigarettes smoked per day, and may truly be moderate or heavy smokers.

COMMENTS: *Since many of the studies in the literature use self-reported data about smoking, it is worth considering the reliability of this data -- especially among various subpopulations. (PJA)*

265. Perez-Stable, E., Marin, B., Marin, G. and Benowitz, N. Perez-Stable and colleagues respond. Am J Public Health 82:1172-3, 1992.

ABSTRACT: This letter to the editor responds to 3 articles published in the September 1990 issue of the Am J Public Health discussing ethnic differences in nicotine exposure. They agree that the topography of tobacco smoke ingestion may partially explain the higher-than-expected cotinine levels among Blacks compared to Whites. They also agree that to attribute these observations of serum continue to genetically-based metabolic differences between ethnic or racial groups is premature and a question in need of further study.

266. Perkins, K.A., Grobe, J.E., Epstein, L.H., et al. Chronic and acute tolerance to subjective effects of nicotine. Pharmacol Biochem Behav 45(2):375-81, 1993.

ABSTRACT: Tolerance to subjective effects of nicotine may induce novice smokers to increase the magnitude and frequency of their nicotine self-dosing. In this study, smokers ($n = 8$) and non-smokers ($n = 7$) participated in three sessions involving presentation of 0, 7.5, or 15 micrograms/kg nicotine 30 min for 2 h via measured-dose nasal spray, with different doses presented on separate days. Subjective responses were assessed using visual analog scales (VASs) of jittery, light-headed, relaxed, dizzy, and head rush, and the Profile of Mood States (POMS) scales of vigor, confusion, fatigue, tension, and the composite scale of arousal. Smaller responses in smokers vs. non-smokers were viewed as evidence for chronic tolerance. In addition, on each day subjects received a fifth, challenge dose of 30 micrograms/kg 30 min after the previous dosing. Smaller responses to the challenge dose as a function of increasing prior nicotine dosing during Trials 1-4 were viewed as evidence for acute tolerance. Results showed significant changes in most measures as a function of nicotine dose, and the dose-response curves for most VAS and POMS scales tended to be shifted to the right, or dampened, in smokers relative to non-smokers, consistent with chronic tolerance. However, smokers and non-smokers tended to respond to nicotine in opposite directions for POMS scales of vigor and arousal, perhaps reflecting withdrawal relief in smokers. Acute tolerance on a few selected VAS and POMS scales was apparent for both smokers and non-smokers. (ABSTRACT TRUNCATED AT 250 WORDS)

267. Petitti, D.B., Friedman, G.D. and Kahn, W. Accuracy of information on smoking habits provided on self-administered research questionnaires. Am J Public Health 71(3):308-311, 1981.

ABSTRACT: In the setting of a prepaid medical care plan, self-administered questionnaires were an accurate source of information on smoking habits and the standard against which the physiologic measures of smoking, serum thiocyanate, and expired carbon monoxide must be judged. Questionnaires responses were internally consistent and highly reproducible. In contrast, the physiological measures had low over-all sensitivity as tests of current tobacco exposure (0.72). Their sensitivity was improved by utilizing the self-reported information. (Am J Public Health 1981; 71; 308-311.)

268. Pippola-Hatakka, M., Tuutti, H. and Honkala, E. Oral health status in a Finnish village. Proc Finn Dent Soc 89(3-4):117-22, 1993.

ABSTRACT: The aim of this study was to describe edentulousness, numbers of remaining teeth, dental caries, caries experience, periodontal pockets, and background factors in a Finnish village. It was particularly aimed at determining the incidence of simultaneous occurrence of untreated caries lesions and periodontal pockets. It was carried out in 1988 in Viekijarvi, a village in North Karelia. Half of the population was invited to participate in the investigation. Seventy-two percent of those invited participated (n = 179). The subjects were examined clinically using standard WHO methods and criteria. The subjects were interviewed to establish socioeconomical factors and health habits. Thirty-five per cent of subjects were edentulous. Numbers of remaining teeth decreased with age, except in the age group 55-59 years. Numbers of teeth and edentulousness were strongly associated with use of dental services but not with health habits. More than half of the dentate population had untreated caries. Of habits affecting health, only smoking was associated with caries. Twenty-nine per cent of the dentate population had shallow pockets and 7% deep pockets. The occurrence of pockets was negatively associated with frequency of handwashing. Only 20% of the dentate population were orally healthy. The age group 55-59 years was healthier than the younger and older groups.

269. Pomerleau, C.S., Garcia, A.W., Pomerleau, O.F. and Cameron, O.G. The effects of menstrual phase and nicotine abstinence on nicotine intake and on biochemical and subjective measures in women smokers: a preliminary report. Psychoneuroendocrinology 17(6):627-38, 1992.

ABSTRACT: Nicotine intake, menstrual and smoking withdrawal symptomatology, and baseline cortisol and MHPG were assessed in nine women smokers under conditions of ad lib smoking and overnight abstinence in three menstrual phases (early follicular, mid-to-late follicular, and late luteal). A trend towards higher nicotine intake ($p < 0.10$) was observed in the mid-to-late follicular phase. Although menstrual symptomatology was not significantly elevated during the smoking abstinence condition overall, abstinence appeared to prevent the normal reduction in symptomatology during the mid-to-late follicular phase that occurred under conditions of ad lib smoking. Menstrual and withdrawal symptoms were highly correlated, and both were most pronounced during the late luteal/abstinence condition. The smoking-specific item craving reflected this pattern, though in attenuated form, suggesting that the observed exacerbation of withdrawal symptomatology was not simply due to generalized dysphoria, as queried in both instruments. MHPG was significantly elevated in the late luteal phase, whereas cortisol was significantly higher during ad lib smoking than during abstinence and tended to be highest in the mid-to-late follicular phase. Further investigation will be needed to determine the functional significance of these findings for understanding and treating smoking in women.

270. Pomerleau, C.S., Ehrlich, E., Tate, J.C., et al. The female weight-control smoker: a profile. J Subst Abuse 5(4):391-400, 1993.

ABSTRACT: Hypothesizing the existence of a subgroup of female smokers for whom nicotine masks, and abstinence unmasks, a tendency toward hyperphagia and perhaps even subthreshold disordered eating, we compared female weight-control smokers (WC; n = 46) and non-weight-control smokers (NWC; n = 52) on smoking- and eating-related variables. We also examined the relationship between weight-control smoking and withdrawal symptomatology during 48-hours of nicotine abstinence (n = 23).

Although WC were not more depressed, anxious, or nicotine-dependent than NWC, they were significantly more likely to report weight gain and increased hunger during abstinence; they also scored higher on Cognitive Restraint and Disinhibition (Three-Factor Eating Questionnaire). The expected correlation of cotinine with weight emerged for NWC but not for WC. Weight-control smoking correlated with increased eating during abstinence. Our findings suggest that WC use dietary restraint as well as smoking to manage weight, and that abstinence may precipitate episodes of disinhibited or binge eating. If WC over include women vulnerable to excess or unpredictable eating and consequently to substantial weight gain that can be managed by nicotine, highly focused treatment strategies may be helpful.

271. Pomerleau, C.S., Teuscher, F., Goeters, S. and Pomerleau, O.F. Effects of nicotine abstinence and menstrual phase on task performance. Addict Behav 19(4):357-62, 1994.

ABSTRACT: Both menstrual phase and nicotine have been shown to affect task performance. Though conflicting results have been reported, at least one well-controlled study has demonstrated that women at midluteal phase show superior performance on speech articulation and speeded motor coordination tests, but poorer performance on perceptual-spatial tests, than during menses. Smokers have demonstrated superior performance on numerous tasks following nicotine than following placebo. To explore the separate and combined influence of these factors, we studied 13 regularly-menstruating smokers using a two (smoking vs. 12 hours' abstinence) by two (menstrual vs. midluteal phase) factorial design. During each session, subjects completed a test battery including two speeded motor coordination tasks, a computerized reaction time test, and the Stroop (1935) color/word test. Subjects completed the Stroop color and color-word tasks significantly faster after ad lib smoking than after overnight abstinence. No other significant differences emerged. Our findings replicate, in an all-female sample, previous reports that speed of cognitive processing is reduced by nicotine abstinence (or enhanced by nicotine administration). Our failure to observe menstrual cycle effects raises the possibility that the anti-estrogenic effects of smoking may attenuate phase differences in performance.

272. Pritchard, W.S., Robinson, J.H. and Guy, T.D. Enhancement of continuous performance task reaction time by smoking in non-deprived smokers. Psychopharmacology 108:437-442, 1992.

ABSTRACT: In a test of the withdrawal-deficit hypothesis of the cognitive effects of cigarette smoking, non-deprived smokers participated in two sessions held on consecutive days. In both sessions, subjects performed two 20-min continuous performance tasks (CPTs). The CPT was a relatively "easy" version designed to require minimal practice (digit 0 target response; digits 1-9 nontarget response: 19% of stimuli targets). In one session, subjects smoked a cigarette prior to each CPT; in the other session they did not smoke (session order counterbalanced). Reaction time (RT) was significantly faster in the smoking session than in the non-smoking session with no difference in number of incorrect responses, a finding incompatible with the withdrawal-deficit hypothesis. Further, light inhalers (as assessed by pre-smoking to post-task increase in expired air carbon monoxide) appeared to process nontarget stimuli faster than deep inhalers, especially in the no smoking session. The results also indicated that, at least during the first CPT of each session, the performance of females in the no smoking session was poorer than in the smoking session and poorer of males regardless of session. In the latter part of the first CPT, the performance of males in the smoking session was better than their performance in the no smoking session. No clear

pattern emerged for the second CPT.

273. Prokhorskas, R.P., Grabauskas, V.I., Baubinene, A.V., Glazunov, I.S. and Domarkene, S.B. [Chief risk factors of ischemic heart disease and mortality of the middle-aged male population of Kaunas]. Kardiologija 27(1):14-9, 1987.

ABSTRACT: A prospective study, averaging 11 years, of a representative sample of 2455 male residents of Kaunas between 45 and 59 years of age has explored relationships between coronary risk factors and mortality due to coronary heart disease (CHD), cancer, injuries, as well as total mortality rates. An original analytical approach has been developed for the analysis of associations between individual risk factors and mortality that allows to exclude the effects of age and other examined factors. A marked relationship has been demonstrated between: coronary mortality and age, arterial blood pressure, cholesterol, glucose tolerance, smoking, body weight, the presence and clinical form of CHD; cancer-related mortality, and age or smoking; traumatic mortality and smoking; total mortality and age, arterial blood pressure, glucose tolerance, body weight, smoking, and the presence and type of CHD.

274. Prosise, G.L., Bonnet, M.H., Berry, R.B. and Dickel, M.J. Effects of abstinence from smoking on sleep and daytime sleepiness. Chest 105(4):1136-41, 1994.

ABSTRACT: This study examined the effect of smoking abstinence on sleep quality, daytime sleepiness, and mood in 18 subjects (10 men and 8 women) aged 35 to 49 years who had smoked at least 20 cigarettes per day for more than 2 years. Subjects were studied on two consecutive weeks following an adaptation night. During week 1 (study nights 1, 2, and 3), the subjects smoked as usual. Smoking abstinence was mandatory during week 2 beginning 3 h prior to night 4 and ending after the final tests on night 6. Complete sleep monitoring each night was followed by multiple sleep latency tests (MSLTs) throughout the day. Psychomotor tests and mood observations were performed throughout the day between the MSLTs. The results of testing when the subjects smoked were compared with those during nonsmoking days and nights. Nights 1 and 4 were considered adaptation nights and not included in the analysis. Overnight studies showed a significant increase in the number of relative arousals (a change in sleep stage to wake, stage 1 sleep, or movement), stage changes, and awakenings during smoking cessation. The MSLT latency to stage 1 sleep decreased during smoking cessation. Also during abstinence, the subjects reported that they felt more irritable, had increased feelings of anxiety, felt greater tension, and had more cravings for cigarettes. We conclude that smoking cessation is associated with increased daytime sleepiness and impaired mood. The daytime sleepiness may be due to the combination of sleep disturbance and withdrawal of the nicotine normally provided through smoking.

275. Ragnarsson, E., Eliasson, S.T. and Olafsson, S.H. Tobacco smoking, a factor in tooth loss in Reykjavik, Iceland. Scand J Dent Res 100(6):322-6, 1992.

ABSTRACT: A random sample of 1023 people 52-79 yr of age out of a group participating in a longitudinal study at the Heart Preventive Clinic of the Icelandic Heart Association in Reykjavik, Iceland, was examined. The examination was carried out in 1985-7. The results on the number of remaining teeth and total edentulousness were compared to information regarding smoking habits and social status. Total edentulousness was more common among women. Total and partial edentulousness was more frequent in the lower employment classes while no statistical difference was found for smoking in this respect. This, however, did not affect the significance of tobacco smoking as a factor in the loss of teeth. In general smokers had fewer remaining teeth and were more often edentulous than ex-smokers, smoking time not considered, who again suffered more tooth loss than those who had never smoked. Therefore it is concluded that tobacco smoking may be a major single independent risk factor in the loss of teeth.

276. Rangemark, C., Ciabattoni, G. and Wennmalm, A. Excretion of thromboxane

metabolites in healthy women after cessation of smoking. Arterioscler Thromb 13(6):777-82, 1993.

ABSTRACT: Cigarette smokers, but not former smokers, excrete more thromboxane A2 (Tx-A2) metabolites in the urine than do lifelong non-smokers, which suggests chronic activation of their platelets. To further characterize the effect elicited by smoking on platelet function, we followed the change in urinary excretion of the 2,3-dinor (Tx-M) and 11-dehydro (dT_x) metabolites of Tx-A2, analyzed by gas chromatography/mass spectrometry and radioimmunoassay, respectively, in eight healthy women who quit habitual smoking and compared it with the recovery of these metabolites after a single dose of acetylsalicylic acid (ASA). Tx-M and dT_x before cessation of smoking were approximately 550 and 600 pg/mg creatinine, respectively. Within 3 days after quitting smoking, Tx-M and dT_x had dropped to stable levels of approximately 300 and 350 pg/mg, respectively. The rates of change in excretion of Tx-M and dT_x after smoking cessation were more rapid ($p < 0.02$ and 0.02, respectively) than those observed during the recovery of platelet function after a single dose of ASA. The excretion of 2,3-dinor-6-keto-prostaglandin F1 alpha, a metabolite of prostacyclin, was not affected by smoking cessation. We conclude that cigarette smoking elicits an increase in platelet activity in the absence of vascular injury. This increase is reversible within the life span of the platelets.

277. Ready, A., Boreskie, S., Law, S. and Russell, R. Fitness and lifestyle parameters fail to predict back injuries in nurses. Can J Applied Phys 18(1):80-90, 1993.

ABSTRACT: Performance on fitness and back related isometric strength tests, as well as the response to a lifestyle questionnaire, were related to the subsequent occurrence of back injuries in 119 nurses. In all, 22% of subjects sustained injuries during the 18-month study. Injured nurses were more likely to be from high-risk wards and to have received worker's compensation pay for past back injuries. Fitness and lifestyle characteristics did not differ significantly between injured and not-injured groups. Using backward stepwise logistic regression, a model was developed that accounted for 41% of the variability between group and predicted 67% of those injured. Prior compensation pay, Smoking status, and job satisfaction were the most useful discriminators. It was concluded, however, that the fitness and lifestyle parameters measured did not effectively predict back injury in nurses.

278. Regan, W.A. Smoking patients: fatal burns and liability. Regan Rep Nurs Law 22(6):1, 1981.

279. Reynolds, K.L., Heckel, H.A., Witt, C.E., et al. Cigarette smoking, physical fitness, and injuries in infantry soldiers. Am J Prev Med 10(3):145-50, 1994.

ABSTRACT: Reliable data on the impact of physical training on light infantry units in terms of injuries and time loss are sparse. This study evaluated a light infantry unit ($n = 181$) prospectively and followed it throughout one year of infantry training and operations. Fifty-five percent of the soldiers ($n = 101$) experienced one or more injuries. Eighty-eight percent of the injuries were training-related conditions, which resulted in 1,103 days of limited duty. Lower extremity overuse injuries were the most common type of injury documented. Fractures accounted for the greatest number of days of limited duty. Risk factors for training-related injuries identified by this study were cigarette smoking, high percentage of body fat, extremely high or low body mass index, low endurance levels, and low muscular endurance levels (sit-ups). Logistic regression showed that cigarette smoking and low endurance levels were independent risk factors for training injuries. These data indicate that the incidence of training-related injuries in infantry units is high. A number of modifiable injury risk factors were identified, suggesting that many of these injuries may be preventable.

280. Reynolds, K.L., Amoroso, P.J., Dettori, J.R., et al. Association of Tobacco Use

With Injuries Among Infantry Soldiers Carrying Loads on a 100-Mile Road March.
Third International Conference for Injury Prevention and Control, Melbourne Australia.
1996.

ABSTRACT: PURPOSE: To examine the effect of age, tobacco use, fitness, and other factors on injuries sustained during a physically demanding 100-mile road march. METHODS: A study was conducted with 218 infantry soldiers who marched with an Army backpack and other equipment (mean weight 47.1 +/- 5.1kg) 20 miles per day for five days. Prior to the march, all soldiers completed a demographic questionnaire that included questions on age, race, tobacco and alcohol use. All march-related injuries were recorded by physician assistants when a soldier reported to a medical station along the road march course, or when a soldier reported to a clinic after the march. In addition to the overall analysis of injuries, foot blisters and time-loss injuries were also analyzed separately. A logistic regression model was used to examine the prognosis of several factors: cigarette smoking, chewing tobacco use, alcohol use, age, height, weight, body fat, race, and fitness (maximum number of situps in two minutes, maximum number of pushups in two minutes, and a two-mile timed run). Odds ratios (OR) and confidence intervals (95%CI) for any injury, blisters, and time-loss injuries were calculated (using trend test models). RESULTS: Mean age was 21.4 +/- 3.9 years. Thirty-six percent (78/218) of the soldiers suffered one or more injuries (59.0% of these were blisters). The odds of incurring injuries was significantly higher in younger soldiers and smokers. More severe injuries (time-loss) were significantly higher in soldiers with slower running times.

	Any Injury		Blisters		Time-Loss Injury	
	OR (95%CI)	p value	OR (95%CI)	p value	OR (95%CI)	p value
Age	0.88 (0.80,0.96)	0.0060	0.87 (0.77,0.98)	0.0268	--	NS
Smoking	1.93 (1.41,2.63)	0.0001	1.57 (1.13,2.18)	0.0076	--	NS
Run Time	--	NS	--	NS	1.25 (1.01,1.55)	0.0374
Goodness of Fit	--	0.0001	--	0.0027	--	0.0380

CONCLUSION: The incidence of injuries is high during a physically demanding activity such as an endurance road march. Younger soldiers and smokers were at a higher risk for injuries. Soldiers with low fitness levels were at a higher risk for severe injuries.

CONFERENCE SUMMARY: *INTRODUCTION: Carrying loads over long distances is a physically demanding occupational task often required of U.S. Army infantrymen. Soldiers must be able to carry their equipment and supplies over long distances in combat operations. Military studies show that strenuous activities such as road marching are associated with acute injuries that lead to significant morbidity. There are only a few studies examining injuries related to marching with loads (over long distances) as might typically be required during military operations. Identifying risk factors is important for developing preventive strategies to reduce injuries associated with military load marches over long distances. However, most of the military march studies that examined injury risk factors were on short march distances, usually less than 20 Km. The purpose of this study was to investigate the incidence and types of injuries associated with a long road march over several days, and the influence of factors such as smoking, age, and fitness on risk of injury.*

METHODS: Two hundred eighteen male light infantry soldiers performed a 100-mile tactical training march at Fort Hunter Liggett, Ca. Soldiers marched by company 20 miles each day for 5 consecutive days. Roads were dry with loose sand and rocks. The terrain was somewhat hilly with some elevation changes of 18 vertical meters. Prior to the march, individuals completed a questionnaire about age, race, tobacco and alcohol history. Body weights and heights were measured. Body fat was estimated by the circumference technique. Baseline physical fitness was assessed from recent U.S. Army Physical Fitness Tests (APFT). Test results included maximal effort two-mile run times, and number of situps and pushups completed within a two minute time period. On the day of the march each soldier's load was weighed using a calibrated digital readout scale. The load consisted of: a) a standard US Army rucksack (ALICE pack) with frame and hip belt, b) battledress uniform (BDU) with standard marching boots, c) load carriage equipment,

d) two canteens of water, and e) two military Meal-Ready-to Eat (MRE) packages. Data were obtained from two sources: 1) Information recorded by physician assistants at medical stations along the march course. 2) Troop clinic records screened by study staff up to 15 days after the road march. For classification purposes, definitions are as follows: 1) Injury- Any overuse or traumatic injury event related to the march. 2) Overuse injuries- Musculoskeletal injuries supposedly caused by repetitive microtrauma associated with the marching. 3) Traumatic injuries- Acute injuries associated with a single event (like tripping on a rock). 4) Lost duty day- An injury-related 24-hour period of medical restriction from physical activities or regular duties. **STATISTICAL ANALYSES:** Means and standard deviations were calculated for continuous variables such as age and two-mile run times. Cumulative incidence of individuals sustaining march-related injuries was calculated by dividing the number of injured soldiers by total number of soldiers studied. Also, incidence was reported for specific type of injury. Logistic regression analyses for three trend test models (any injury, blisters, and time-loss injuries) were performed to examine the interrelationships among risk factors. Models were required to have a goodness of fit < 0.05 to report significance. Eleven factors were entered into the model: age, race, smoking history, alcohol history, height, weight, % body fat, BMI, run time, pushups, and situps. The probability to remove a factor from the models was set at > 0.10 .

RESULTS: This population of soldiers was lean and physically fit even relative to their US Army peers (Table 1) (12). **Injury Outcomes:** A total of 98 injuries were associated with the march. Blisters were found for 46 soldiers (21.1%, 46/218) (Table 2). Seventeen soldiers (8.0%, 17/218) were unable to complete the march due to their injuries. Incidence of any injury including blisters and time-loss injuries were noted for 78 soldiers (35.8%, 78/218). Overuse type injuries accounted for 91 out of the 98 injuries (93.0%) (Table 2). All injuries (overuse and traumatic) involved either the back or the lower extremities. Injuries resulted in a total of 69 days of lost duty time (Table 3). Injuries resulting in one or more lost duty days were found for 27 soldiers (12.4%, 27/218). Foot pain accounted for the greatest amount of lost duty time (32.0%), followed by blisters (29.0%). The majority of injuries were reported on the second day of the march between 21 and 40 miles (Figure 1). There were no injuries reported during the final days of the march. **Logistic Regression Analyses:** For any injury, the overall goodness of fit for the trend test model was $p = 0.0001$. The model included age (continuous, $p = 0.0060$, OR = 0.876 per year) and smoking (categorical, $p = 0.0001$, OR = 1.926 per category). There was an overall increased risk for decreasing age and for increasing cigarette use. **Blisters Model:** the overall goodness of fit for the trend test model was $p = 0.0027$. The model included age (continuous, $p = 0.0268$, OR = 0.873 per year) and smoking (categorical, $p = 0.0076$, OR = 1.569 per category). There was an overall increased risk for decreasing age and increasing cigarette use. **Time-Loss Injury Model:** the overall goodness of fit for the trend test model was $p = 0.0380$. The model included running time (continuous, $p = 0.0374$, OR = 1.253 per minute). There was an overall increased risk for slower running times.

CONCLUSIONS: 1. Carrying heavy loads for long distances over several days results in high injury rates and significant time-loss. 2. Overuse injuries accounted for a majority of injuries. Perhaps proper march training could reduce injuries associated with participating in physically demanding occupational tasks such as carrying loads over long distances. 3. Foot pain and foot blisters were the most common injuries reported and accounted for the greatest amount of time lost. 4. Young age, history of smoking, and low fitness are risk factors for injuries during long road marches with heavy load carriage over several days. 5. Systematic identification of risk factors for injuries associated with high risk physical tasks may be important for designing countermeasures to reduce injuries. (KLR)

281. Ribeiro, E.B., Bettiker, R.L., Bogdanov, M. and Wurtman, R.J. Effects of systemic nicotine on serotonin release in rat brain. Brain Res 621(2):311-8, 1993.

ABSTRACT: We used *in vivo* microdialysis to examine the acute effects of systemically administered nicotine (0.8-8.0 mg/kg, s.c.) on extracellular levels of serotonin (5-HT) in the frontal cortex of awake rats

and animals anesthetized with chloralose/urethane. In anesthetized animals, 5-HT efflux was elevated during the initial 15 min after nicotine administration (2-8 mg/kg), but then returned to baseline values. All of the effective nicotine doses also lowered and then raised blood pressure in these animals. However, other drugs which raised (methoxamine, 0.07 mg/kg, i.v.) or lowered (mecamylamine, 5 mg/kg, i.p.) blood pressure without directly activating nicotinic receptors failed to alter 5-HT release. Moreover, pretreatment with a centrally active dose of mecamylamine, a known nicotinic antagonist, blocked the effects of nicotine (4 mg/kg) on 5-HT release. For studies on awake rats the perfusion fluid also contained fluoxetine, since basal 5-HT levels were barely detectable without this uptake blocker. In such animals, 1.6 mg/kg of nicotine significantly increased 5-HT release, an effect apparent in the initial 20 min after treatment and persisting for at least 2 h. These observations demonstrate that systemically administered nicotine increases frontocortical 5-HT release, that this effect is independent of the cardiovascular responses to the drug, and that it probably results from the activation of previously described nicotinic receptors on raphe neurons. The present findings are consistent with the hypothesis that the appetitive and mood disturbances associated with nicotine withdrawal may be mediated by diminished serotonergic transmission.

282. Richmond, R. Beneficial effects of nicotine: fact or fiction? [comment]. Addiction 89(2):139-40; discussion 144-6, 1994.

283. Riihimaki, H., Wickstrom, G., Hanninen, K., et al. Radiographically detectable lumbar degenerative changes as risk indicators of back pain. A cross-sectional epidemiologic study of concrete reinforcement workers and house painters [see comments]. Scand J Work Environ Health 15(4):280-5, 1989.

ABSTRACT: The association between radiographically detectable degenerative changes in the lumbar spine and back symptoms was studied, along with the possible effect of occupational work load. The subjects were 216 concrete reinforcement workers and 201 house painters. A questionnaire provided information on work history and earlier back accidents, and a standardized interview produced data on back symptoms. The occurrence of disc space narrowing, anterior and posterior spondylophytes, and end-plate sclerosis was recorded separately for each intervertebral space from lateral lumbar radiographs. Moderate to severe degenerative changes were associated with increased risk of sciatic pain but not with the occurrence of lumbago or nonspecific back pain. The different types of degenerative changes provided no further information. In a multivariate logistic regression analysis degenerative changes and earlier back accidents were significant independent predictors of sciatic pain. When these two variates were allowed for, the effect of occupation was not significant.

284. Robertson, P.B., Derouen, T.A., Ernster, V.E., et al. Smokeless tobacco use: How it affects the performance of major league baseball players. JADA 126(August):1115-21, 1995.

ABSTRACT: The authors examined the effect of smokeless tobacco use on athletic performance of major league baseball players during the 1988 season. They evaluated performance records of 158 players on seven major league teams who played or pitched at least 10 games or innings during the 1988 season. Smokeless tobacco use, they concluded, is not related to player performance in major league baseball but does place players at significantly increased risk for mucosal lesions and other oral pathology.

COMMENTS: *This fascinating article unfortunately didn't go far enough in its analysis of the data. The authors report a lack of statistical differences between users and nonusers of smokeless tobacco. Yet, when looking at the crude numbers, one might infer a slight disadvantage to users over nonusers of smokeless tobacco. In addition, the authors may have been too conservative in using a two-tailed test where a 1-tailed would have been acceptable. Also, the analyses performed in the paper were only*

univariate. Further study or more sophisticated analysis may demonstrate a more negative effect of smokeless tobacco use. (PJA)

285. Rogot, E. and Murray, J.L. Smoking and causes of death among U.S. veterans: 16 years of observation. Public Health Rep 95(3):213-22, 1980.

COMMENTS: *To describe the relationship between tobacco use and mortality experience, the Public Health Service in 1954 initiated a study of a cohort of U.S. veterans. The cohort was followed through December 1969 for a total of 16 years prior to this report. The initial study population consisted of 293,958 veterans 31-84 years of age. 68% responded to a mail questionnaire on smoking habits. Deaths observed among smokers were greater than expected for suicide, accidents and violence, and the combination of all three. (PJA)*

286. Ross, R.K., Bernstein, L., Trent, L., Henderson, B.E. and Paganini-Hill, A. A prospective study of risk factors for traumatic deaths in a retirement community. Prev Med 19(3):323-34, 1990.

ABSTRACT: We examined possible predictors of traumatic deaths by means of a case-control study nested within a large ongoing cohort study of residents of a Southern California retirement community. Baseline information was collected by means of a detailed mailed health survey completed by 11,888 residents in 1981-1982. In multivariate logistic regression analysis, being widowed or divorced (RR = 6.4, P = 0.009), sleeping 9 or more hours per night (RR = 4.6, P = 0.02), and drinking more than three alcoholic beverages a day (RR = 3.5, P = 0.04) were significant predictors of suicide risk. However, the strongest predictor of suicide was a mental outlook assessment summary score calculated from responses to seven questions derived from the Zung self-rating depression scale. Individuals in the poorest summary score category were 23 times more likely to commit suicide than individuals in the best summary score category (P = 0.004). Women who regularly practiced breast self-examination were also at very low risk for suicide (RR = 0.1, P = 0.0005). The mental outlook assessment summary score was also a predictor of accidental deaths, although the relative risk estimates were lower than those for suicide and the individual questions best predicting risk were different. A history of a serious chronic disease (RR = 2.6, P = 0.01) and moderate alcohol intake of less than two drinks per day (RR = 0.3, P = 0.01) were also predictors of accidental deaths. Estrogen use in women did not predict risk of traumatic deaths.

COMMENTS: *"A history of cigarette smoking was strongly associated with suicide. There was a statistically nonsignificant increase in the risk of accidental death among persons ever smoking cigarettes. For both accidental death and suicide, risk of past smokers was intermediate between that of lifetime non-smokers and current smokers." Does the intermediate risk of former smokers suggest something about the mechanism of tobacco's influence on injury outcomes? Are "ever smokers" more similar in a behavior sense to smokers than to "never smokers"? Can we suppose that former smokers are free of many of the physiological effects of tobacco use, or do they suffer long term/permanent deficits? (PJA)*

287. Ryan, J., Zwerling, C. and Orav, E. Occupational risks associated with cigarette smoking: A prospective study. Am J Public Health 82:29-32, 1992.

ABSTRACT: *Background: Studies have indicated that cigarette smokers have more occupational accidents and injuries and use more sick time and health benefits than non-smokers, thereby producing sizable costs for employers. However, they usually have not controlled for other possible sources of these costs. We analyzed occupational costs associated with smoking while adjusting for a number of potential confounders. Methods: We conducted a prospective, controlled study of the association between smoking and employment outcomes in 2537 postal employees, adjusting for age, gender, race, drug use, job category, and exercise habits. Results: For smokers, the relative risk for turnover was 1.01*

(95% confidence interval [CI], 0.83-1.21); for accidents 1.29 (CI, 1.07-1.55); for discipline 1.55 (CI, 1.19-2.02). Their mean absence rate was 5.43% compared to 4.06% for non-smokers.

COMMENTS: *Study did show an increased risk for injury among smokers, but did not control for alcohol. This was basically an epi study and did not go into possible reasons for the association between smoking and injury. (JAB)*

288. Ryan, J., Zwerling, C. and Jones, M. Cigarette smoking at hire as a predictor of employment outcome. J Occup Med, in press, 1996.

ABSTRACT: We have reported that cigarette smoking at the time of hire is associated with elevated rates of accidents, injuries, absence, discipline and firing in Postal workers. We followed this cohort of 2537 for a second year to assess whether these associations would change with time in a workplace with active smoking cessation programs. Smokers' elevated risks for accidents, injuries, and discipline decreased after the first year. Risk for involuntary turnover was slightly higher in the two-year analysis. The elevation in absence for smokers remained comparable in both periods. Although it is possible that the decline in the relative risk of accidents, injuries and discipline may reflect changes in smoking status, we were unable to obtain follow up data on smoking status to test this hypothesis.

289. Sachdev, P.S. Behavioral factors affecting physical health of the New Zealand Maori. Soc Sci Med 30(4):431-40, 1990.

ABSTRACT: A major factor in the etiology of illness is the behavior of individuals with regard to certain risks and hazards of the environment. The Maori of New Zealand have been shown to be at greater risk of illness and death than their non-Maori counterparts. It is estimated that a significant proportion of this excess morbidity and mortality can be attributed to at least four behavioral factors: smoking, obesity, alcohol use and accidents. This paper examines the inter-cultural differences in these factors, both from a contemporary and an historical perspective. Some of the reasons for the continuation of these adverse patterns of behavior are explored, in particular the role of psycho-cultural stress. Some possible mechanisms of effecting behavioral change in modern Maori society are discussed.

COMMENTS: *The Maori have significantly higher smoking rates than non-Maori groups. They also have higher death rates from accidents. The authors discuss the role of psycho-cultural stress on health. They point out that risk-taking behaviors have often been attributed to anxiety or seen as methods of coping with stress. The Maori may have additional stress associated with the discrepancy between traditional Maori society and modern society. They also have stress associated with minority status in society. This minority status includes poverty, unemployment, and a sense of powerlessness. Although the authors do not attempt to correlate the two, other articles suggest a relationship between smoking and stress levels. Other risk-taking behaviors may also be related to stress levels and may increase the risk for injury. (JAB)*

290. Sacks, J.J. and Nelson, D.E. Smoking and injuries: an overview. Prev Med 23(4):515-20, 1994.

ABSTRACT: BACKGROUND. Although the disease consequences of cigarette smoking are well documented, smoking may also be associated with increased risk of injury. Our purpose is to provide an overview of this potential association. METHODS. We conducted a literature review. RESULTS. Cigarettes are the leading cause of death from fire and the second leading cause of fire-related injury. Studies estimate that compared with non-smokers, smokers appear 1.5 times more likely to have a motor vehicle crash, 1.4-2.5 times more likely to be injured at work, and 2.0 times more likely to suffer other unintentional injuries. A variety of reasons may explain an association between cigarette smoking and

injuries; these include (a) direct toxicity; (b) distractibility; (c) smoking-associated medical conditions; and (d) confounding factors, including personality or behavioral characteristics. CONCLUSIONS. Smoking may be an independent risk factor for thermal, motor vehicle, occupational, and other unintentional injuries. Non-smokers may be at increased risk of injury from the presence of smokers in their environments, e.g., from fires. Societal benefits from decreased smoking prevalence are likely to include reduction of both fatal and nonfatal injuries.

COMMENTS: *In this well-written review, observed associations between smoking and injuries are discussed, including behavioral factors. Mention is given to the indirect relationship between smoking and suicide because both are linked to depression. It is pointed out that several studies suggest that "smokers are more likely than non-smokers to be nervous, anxious, and emotional and to display hysterical personality characteristics or obsessional traits or to act out hostility. It is pointed out that smoking may be an indicator of risk-taking behavior which is itself a risk factor for injury. Therefore, the cessation of smoking would not eliminate the underlying risk.* (JAB)

291. Saraste, H. and Hultman, G. Life conditions of persons with and without low-back pain. Scand J Rehabilitative Med 19:109-113, 1987.

ABSTRACT: A comparison of life conditions (such as dwelling, health, leisure-time activities, education, occupation, and work characteristics) was made between age-and-sex- stratified groups of persons with and without low-back pain (BP). The primary data were collected from a random, geographically standardized 1 : 1000 sample of the Swedish population including 2,872 citizens aged 30-59 years. There were no differences with respect to dwelling, height, weight, habits of physical exercise, other non-occupational activities, and frequency of unemployment. In the group of 50-59 year old persons, the males with BP smoked more than those without. In the same age-group of females, and in younger male groups there were no differences in smoking habits. Physically heavy, monotonous, and repetitive work was more frequent among the subjects with BP. The relative number of high school-educated was lower among males --in the younger age group-- with BP. The back-healthy persons evaluated their state of health as better and their need of medical care as less than the persons with BP.

COMMENTS: *This study found a higher frequency of smokers in the group that suffered from low back pain as compared to the healthy back group across all age groups, although it was statistically significant in the male group of 50-59 years only.* (JAB)

292. Schmeltz, I., Stedman, R.L., Chamberlain, W.J. and Stills, C.D. Benzyl esters, indoles and carbazoles in cigarette smoke. Chem Ind 49:2009-10, 1965.

293. Schmeltz, I., Stills, C.D., Chamberlain, W.J. and Stedman, R.L. Analysis of cigarette smoke fraction by combined gas chromatography -- infrared spectrophotometry. Anal Chem 37:1614-6, 1965.

ABSTRACT: The study illustrates the utility of gas chromatography and infrared spectrophotometry for analyzing cigarette smoke. Several of the compounds identified in the ether codistillate have also been found in the methanol codistillate of cigarette and cigar smoke condensate. These compounds include toluene, ethylbenzene, m-xylene, o-xylene, styrene, and dipentene.

294. Schori, T.R. and Jones, B.W. The effect of smoking on risk-taking in a simulated passing task. Hum Factors 19(1):37-45, 1977.

ABSTRACT: Smokers are reported to be involved in traffic accidents more frequently than non-smokers. One possible explanation for this is that smokers may take more risks (or may be less accurate in evaluating

risk) than non-smokers. To explore this possibility, non-smokers, smokers-deprived, and smokers were required to perform a simulated car passing task- a task which, in actual driving situations, may be fraught with risk. However, no significant differences were detected as a function of the Smoking Condition. Therefore, it was concluded that non-smokers, smokers-deprived, and smokers did not differ either in their willingness to take risks or in the accuracy with which they were able to evaluate risk. Difference were detected, though, as a function of trials, viz., with practice, the subjects became more accurate in evaluating risk.

COMMENTS: *This apparently well-designed study did not detect a performance difference between the three "Smoking Conditions." The task employed, however, as the authors admit, was highly artificial and may not have adequately stressed the subjects or may not have tested them on a task at which smokers would be at a disadvantage.* (PJA)

295. Schouten, J.S., van den Ouwehand, F.A. and Valkenburg, H.A. A 12 year follow up study in the general population on prognostic factors of cartilage loss in osteoarthritis of the knee. Ann Rheum Dis 51(8):932-7, 1992.

ABSTRACT: The natural history and prognostic factors of cartilage loss in osteoarthritis of the knee were studied in subjects from a general population survey on rheumatic diseases in 1975-8. Baseline data were collected by questionnaire, physical examination, and weightbearing anteroposterior knee radiographs. Follow up of the subjects aged 46-68 years with radiological osteoarthritis grade 2-4 (Kellgren) took place in 1988-9. Cartilage loss was assessed by two observers who scored the change in joint space width between two radiographs. Thirty four per cent had cartilage loss. Prognostic factors and adjusted odds ratios (ORs) (95% confidence intervals) were: body mass index OR = 11.1 (3.3 to 37.3) fourth v first quartile; body weight OR = 7.9 (2.6 to 24.0) third v first tertile; age OR = 3.8 (1.1 to 13.4) > 60 v < or = 49 years; Heberden's nodes OR = 6.0 (1.5 to 23.1); clinical diagnosis of generalized osteoarthritis OR = 3.3 (1.3 to 8.3); and previous bow legs or knock knees OR = 5.1 (1.1 to 23.1). The relation of age with cartilage loss was also confounded by the presence of Heberden's nodes or a diagnosis of generalized osteoarthritis. There was no statistically significant relation for gender, meniscectomy, injury, uric acid concentration, chondrocalcinosis, smoking, and occupation related factors, except possibly standing.

296. U.S. Department of Health and Human Services. Reducing the Health Consequences of Smoking: A Report of the Surgeon General, Rockville, MD: Centers for Disease Control, Office on Smoking and Health, DHHS publication no. (CDC) 89-8411, 1989.

297. Sherwood, N., Kerr, J.S. and Hindmarch, I. Psychomotor performance in smokers following single and repeated doses of nicotine gum. Psychopharmacology 108:432-6, 1992.

ABSTRACT: The psychomotor effects of single and repeated doses of 2 mg nicotine gum were investigated in 13 regular smokers who had abstained from tobacco overnight. In comparison to baseline, a first dose of nicotine led to significantly raised critical flicker fusion thresholds, faster motor reaction times, improved compensatory tracking performance, and faster short-term memory reaction times. Performance after a second and third dose of nicotine remained significantly improved on all measures in comparison to baseline, and absolutely improved when comparing first and third nicotine doses on measures of sensorimotor performance. Throughout, comparisons with a placebo gum condition confirmed that these effects were genuine and not subject to the development of acute nicotine tolerance, suggesting that the enhancement of psychomotor performance experienced by smokers after a first cigarette may be maintained by repeated smoking.

COMMENTS: *This study tested only smokers (nicotine gum group) and deprived smokers (the placebo group). It is difficult to accept that the volunteers wouldn't be able to tell whether they were receiving nicotine or placebo. This fact alone could cast considerable doubt on the findings. The authors freely admit the difficulty in distinguishing between the effects of nicotine, which can be attributed to an absolute improvement in performance (primary effects), and those which suggest relief of withdrawal effects after a period of abstinence (secondary effects). The "enhancement" in psychomotor performance that they state is maintained by repeated smoking may be nothing more than the prevention of withdrawal. If nothing else, this work adds additional evidence of the psychomotor deficits which can occur among deprived smokers. This may have particular military relevance, given the number of situations where deprived smokers in the military must perform complex psychomotor tasks: flying, parachuting, etc. (PJA)*

298. Silcox, D.H., Daftari, T., Boden, S.D., et al. The effect of nicotine on spinal fusion. Spine 20(14):1549-53, 1995.

ABSTRACT: STUDY DESIGN: An animal model of posterior lateral intertransverse process fusion healing in the face of systemic nicotine. OBJECTIVES: To evaluate the effect of systemic nicotine on the success of spinal fusion and its effect on the biomechanic properties of a healing spinal fusion in an animal model. SUMMARY OF BACKGROUND DATA: Clinical observations suggested that cigarette smoking interferes with the healing of bony fusion. No direct link has been made to implicate nicotine as a cause for impaired healing of spinal fusions or fractures. METHODS: Twenty-eight adult female New Zealand white rabbits underwent single level lumbar posterior lateral intertransverse process fusion using autologous iliac bone graft. Animals were randomly assigned to either receive systemic nicotine or receive no nicotine. Animals were killed 35 days after surgery. Manual testing of the fusion mass was performed to determine the fusion status. Each fusion mass underwent biomechanic testing. RESULTS: Fifty-six percent of the control animals were judged to have solidly fused lumbar spines, and there were no solid fusions in the nicotine group ($P = 0.02$). The mean relative fusion strength in the control group was greater ($P = 0.09$) than in the nicotine group. For the comparable stiffness figures, the control group was greater than the nicotine group ($P = 0.08$). CONCLUSIONS: This animal model established a direct relationship between the development of a nonunion in the presence of systemic nicotine. The results suggested that bone formed in the face of systemic nicotine may have inferior biomechanic properties.

COMMENTS: *This article provides important further evidence of a primary negative effect of nicotine on healing processes -- at least in an animal model. The 100% non-union rate in the nicotine group is indeed a dramatic result. The mechanism of nicotine's effect in this study is not discussed. (PJA)*

299. Slade, J. Smoking, alcohol, and neuromuscular function in older women. JAMA 273(17):1333-4, 1995.

COMMENTS: *In this letter to the editor, Slade comments on an article by Nelson et al. (JAMA; 272:1825-1831, 1994). He summarizes several reports which link smoking to reduced physical performance and increased injury risk -- including one USARIEM study (Reynolds et al. 1994). While recent attention has focused on the behavioral, subjective, and addictive qualities of nicotine, nicotine also has actions on the spinal cord and in peripheral sites, including autonomic ganglia and the vagal afferents in the lung. The net effect of nicotine's action on skeletal muscles is that it relaxes them. One result might be a reduction in the efficiency of the neuromuscular unit. This manifest itself as a reduction in physical fitness. The author argues that this diminution in fitness might increase the likelihood of injury by impairing the ability of the musculoskeletal system to make timely, tiny adjustments in the response to momentary changes in load and balance. See also letter by Spilich same page. (PJA)*

300. Slemenda, C.W., Hui, S.L., Longcope, C. and Johnston, C.C., Jr. Cigarette

smoking, obesity, and bone mass. J Bone Miner Res 4(5):737-41, 1989.

ABSTRACT: This study was designed to assess the effects of smoking on bone mass and bone loss and to ascertain whether these effects are independent of effects on adiposity and hormone concentrations. A total of 84 healthy, peri- and postmenopausal women were studied prospectively over 3 1/2 years. Heavy smokers had significantly (p less than 0.05) lower radial and vertebral bone mineral content than light or non-smokers (who did not differ from each other). In regression models, which contained measurements of obesity, pack-years smoking remained a significant predictor of bone mass. However, there were no detectable effects of smoking on rates of bone loss at any site. Smokers appear to be at greater risk of osteoporosis due to their lower bone mass. However, this reduced bone mass is already present around the time of menopause, and rates of bone loss during this period do not appear to be influenced by smoking. Furthermore, we have previously shown in this population that menopausal serum estrogen concentrations (which determine rates of bone loss) do not differ between the smokers and non-smokers. Further studies of larger groups are required to determine whether small differences in bone loss may exist, since the power to detect such differences was not ideal in this study.

301. Slemenda, C.W., Christian, J.C., Reed, T., et al. Long-term bone loss in men: effects of genetic and environmental factors. Ann Intern Med 117(4):286-91, 1992.

ABSTRACT: **OBJECTIVE:** To identify environmental factors associated with bone loss in adult male twins and to determine the extent to which shared environmental characteristics affect estimates of the genetic influence on bone loss. **DESIGN:** A 16-year cohort study. **SETTING:** A midwestern university hospital. **PARTICIPANTS:** One hundred and eleven male veterans of World War II or the Korean conflict, born between 1916 and 1927. All were twins, with the sample comprising 48 pairs and 15 persons whose twin brothers were deceased or seriously ill. **MEASUREMENTS:** Bone mass and environmental characteristics (cigarette smoking, alcohol consumption, physical activity, dietary calcium intake, use of thiazide diuretics) measured at baseline and 16 years later. **RESULTS:** Rates of radial bone loss averaged 0.45% per year. Those who both smoked and used alcohol at levels greater than the median for the population had a rate of bone loss (10% in 16 years) twice the rate of those who were below the median level for both variables (5% bone loss, P = 0.003). Rates of bone loss were correlated within twin pairs, and these correlations were diminished 25% to 35% by adjustments for environmental influences on bone loss. However, statistically significant within-pair correlations remained (r = 0.4), which did not differ between monozygotic and dizygotic twin pairs after adjustments for smoking, alcohol use, dietary calcium intake, and exercise. **CONCLUSIONS:** Bone loss in men during mid-life is determined, at least in part, by environmental factors, including smoking, alcohol intake, and, possibly, physical activity. Rates of bone loss were similar within twin pairs, apparently because of a shared environment.

302. Slemenda, C.W. Cigarettes and the skeleton. New Engl J Med 330(6):430-1, 1994.

303. Soder, P.O., Jin, L.J., Soder, B. and Wikner, S. Periodontal status in an urban adult population in Sweden. Community Dent Oral Epidemiol 22(2):106-11, 1994.

ABSTRACT: The purpose was to describe the current periodontal status in a Swedish urban population aged 31-40 yr. 1681 individuals, 840 men and 841 women, participated in the study. 68.5% of the subjects had low amount of plaque, 82.8% low level of calculus and 28.9% healthy gingiva or mild gingivitis. 82.8% of the subjects had no pockets with probing depth (PD) $>$ or = 5 mm. 4.9% of the subjects had one tooth with PD $>$ or = 5 mm, 6.7% 2-5 teeth, 2.4% 6-9 teeth and 3.2% $>$ or = 10 teeth with pockets. 55.8% of the subjects had no missing teeth, third molars excluded. 16.5% had one tooth missing, 23.8% 2-5 teeth, 2.7% 6-9 teeth and 1.2% $>$ or = 10 teeth. 8.6% of the subjects had at least one front tooth missing, 28.7% one premolar and 24.1% one molar missing. Men had significantly higher

scores than women for plaque (DI-S), calculus (CI-S), gingivitis (GI-M), and number and percent of remaining teeth with PD > or = 5 mm. Smokers had significantly higher scores than non-smokers for DI-S, CI-S, GI-M, number and percent of remaining teeth with PD > or = 5 mm, and number of missing teeth. The individuals who visited the dentist every year had better oral hygiene and gingival status than those who attended for > 3 yr. The multiple regression analysis showed that calculus ($P = 0.0001$) smoking ($P = 0.001$), and dental visits ($P = 0.0284$) were significantly correlated to the number of teeth with PD > or = 5 mm.

304. Spilich, G., June, L. and Renner, J. Cigarette smoking and cognitive performance. British Journal of Addiction 87:1313-26, 1992.

ABSTRACT: While some investigations into the relationship between smoking and cognitive performance have reported that smoking facilitates performance, other research has come to the opposite conclusion. A review of the literature suggests that this variance in results may be due to differences among studies in design (comparing smokers only with deprived smokers rather than with non-smokers) and also to differences in task demands. Therefore, performance of smokers having just smoked, matched smokers deprived for a brief period, and also non-smokers was contrasted on a series of tasks which ranged from repetitive and perceptually-bound tasks to complex, dynamic tasks dependent on long-term memory. It was found that while cigarette smoking had no negative effect upon performance for simple perceptual tasks, smoking was found to exert measurable negative effects upon performance for more complex information processing tasks.

305. Spilich, G. and Flynn, L. Does cigarette smoking affect visual performance? Insight: The Visual Performance Technical Group Newsletter. 15: 1-3, 1993.

306. Spilich, G. Cognitive benefits of nicotine: fact or fiction? [comment]. Addiction 89(2):141-2; 144-6, 1994.

307. Spilich, G., Welch, T., Flynn, L. and An, J. Effect of Cigarette Smoking Upon Cognitive Performance. Cognitive Neuroscience, San Francisco, CA, 1995.

ABSTRACT: The importance of cholinergic systems in cognitive performance has long been known; recently the focus of this work has shifted from muscarinic receptors to nicotinic receptors, perhaps because of the observation that smokers are less likely to suffer from Alzheimer's disease and because of the general body of literature that concluded nicotine is a cognitive enhancer. The present research includes a non-smoking control on a wide continuum of tasks; for example, a simple perceptual task, a Sternberg scanning task, a text comprehension task, a P300 ERP task, and a part-whole driving simulator designed to measure performance on sensory, attentional, and cognitive measures relevant to accident avoidance. For the P300 task, carboxyhemoglobin inferred from alveolar CO as well as nicotine levels derived via salivary assay were used as covariates. The performance of smokers was not significantly different from that of non-smokers on rapid perceptual tasks but performance of smokers degraded significantly as compared to non-smokers on more complex tasks. These results are used to frame a more comprehensive theory of the effects of nicotine as a cholinergic agonist.

308. Spilich, G. Smoking, alcohol and neuromuscular function in older women. JAMA 273(17):1334, 1995.

COMMENTS: *In this letter to the editor, Spilich comments on an article by Nelson et al. (JAMA;272:1825-1831, 1994). Dr. Spilich observes that the tobacco-related decline in physical performance reported by Nelson et al. is both clinically relevant and dose-related. He also points out the global implications of the*

findings when the increased risk of motor vehicle accidents among smokers is considered. Age, tobacco use, and impaired recovery ability from serious injury might combine in elderly smoking drivers with very poor results. (PJA)

309. Spilich, G., An, J, Athey, Self, Waicker . Role of Nicotine and COHb in Vehicular Accidents Among Smokers. Eastern Psychological Association, Philadelphia, PA, 1996.

COMMENTS: *The authors review the relationship of smoking to vehicular accidents. Previous studies have suggested that smokers are involved in more accidents because they are risk takers. Spilich et al. pose an interesting question. Could risk taking be an effect rather than a cause of smoking (i.e., do reductions in the speed and capacity of working memory clearly lead to reductions in complex cognitive performance?) In this abstract, the authors report findings from a pilot study using a computer-driven battery of tasks relevant to driving performance known as the APT. Two groups of 10 smokers and 10 non-smokers were compared. There was no difference between groups on simple reaction time measures, there was a non-significant difference on one cognitive measure and a significant difference in another cognitive measure. The authors also found a relationship to salivary nicotine and performance. As nicotine levels rise, performance on the reaction time test improved. However, the opposite was true for the more complex testing. COHb had no significant prediction ability at the levels observed in this study. The authors conclude that the facilitating effects of nicotine may not be found across all types of cognitive tasks, such as tasks related to driving in difficult circumstances. (PJA)*

310. Stallones, L., Pratt, D.S. and May, J.J. Reported frequency of dairy farm-associated health hazards, Otsego County, New York, 1982-1983. Am J Prev Med 2(4):189-92, 1986.

ABSTRACT: We surveyed a self-selected sample of dairy farm owners/residents to determine the feasibility of establishing a surveillance system that would identify health risks common to this type of farming activity. Data obtained included demographic characteristics of the farm families, number of milk cows, prevalence of selected respiratory diseases, and farm-related injuries among farm owners. Despite a low overall response rate (45 percent), farm owners/residents reported a higher prevalence of respiratory conditions than that of the United States as a whole. Male farm owners were less likely to smoke than U.S. white males as a whole. The number of farm owners reporting farm-related injuries during a one-year period (9 percent) was similar to previous reports.

311. Stenlund, B., Gokdie, I., Hagberg, M. and Hogstedt, C. Shoulder tendinitis and its relation to heavy manual work and exposure to vibration. Scand J Work Environ Health 19:43-49, 1993.

ABSTRACT: Three categories of construction industry workers (54 bricklayers, 55 rockblasters, and 98 foreman) were compared in a cross sectional study. In a structured interview they reported exposure to loads lifted, vibration, and years of manual work. They were also subjected to a clinical investigation including medical history and a detailed shoulder examination. Among the rockblasters 33% had signs of tendinitis in the left and 40% in the right shoulder. Among the bricklayers and foreman 8-17% had signs of shoulder tendinitis. In a multiple logistic regression being a rockblaster compared with being a foreman showed an odds ratio (OR) of 3.33 for left-sided and 1.71 for right-sided shoulder tendinitis. Vibration exposure yielded an OR of 1.84 and 1.66 for the left and right sides, respectively. Vibration exposure or work as a rockblaster seemed to be risk indicators for tendinitis of the shoulders.

COMMENT: *In this study smoking habits, age, dexterity and sports activities were all assessed as potential confounders. This study found that smoking prevalence increased with increasing amounts of heavy*

work. Bricklayers had the highest prevalence (83% were smokers or ex-smokers) followed by rock blasters (80% were smokers or ex-smokers) and foreman (63% were smokers or ex-smokers). In addition, regression analysis of signs of shoulder tendinitis in relation to loads lifted resulted in an adjusted odds ratio for smoking of 3.37 for the right side and 2.15 for the left side. Similar odds ratios were obtained when looking at signs of shoulder tendinitis in relation to vibration and years of manual work (right 3.06, left 2.15 and right 3.28, left 2.03, respectively). (JAB)

312. Stewart, R.D., Baretta, E.D., Platte, L.R., et al. Carboxyhemoglobin concentrations in blood from donors in Chicago, Milwaukee, New York, and Los Angeles. Science 182(119):1362-4, 1973.

ABSTRACT: To determine the carbon monoxide exposure experienced by the residents of Chicago, Los Angeles, Milwaukee, and New York, venous blood samples were obtained from adults at arbitrarily chosen blood banks collection sites in the four cities and analyzed for circulation carbon monoxide, carboxyhemoglobin. For comparative purposes, blood was obtained from volunteers breathing carbon monoxide-free air and was found to contain 0.45 percent carboxyhemoglobin. By contrast a high percentage of all the nonsmoking blood donors breathing city air had carboxyhemoglobin saturations greater than 1.5 percent, which indicated that exposure to carbon monoxide in excess of that permitted by the quality standards of the Clean Air Act of 1971 was widespread and occurring regularly.

COMMENTS: *Smokers had higher carboxyhemoglobin saturations than non-smokers. (KLR)*

313. Stewart, R.D., Baretta, E.D., Platte, L.R., et al. Carboxyhemoglobin levels in American blood donors. JAMA 229(9):1187-95, 1974.

ABSTRACT: A national survey was conducted in 1969-1972 for the purpose of determining the range of carboxyhemoglobin (COHb) levels in various segments of the American population. Venous blood samples for COHb analysis were obtained from 29,000 blood donors living in urban, suburban, and rural communities across the United States. For comparative purposes, COHb measurements were made on samples obtained from 11 volunteers breathing air free of carbon monoxide (CO) or air with known concentrations of CO. The mean COHb saturation of four adults breathing CO-free air was 0.45%. Forty-five percent of all the nonsmoking blood donors tested had COHb saturations of more than 1.5%. This indicated that exposure to CO in excess of that permitted by the Air Quality Standards was widespread and occurring regularly. Tobacco smoking was the single most important factor responsible for the highest COHb saturations observed. The other chief factors influencing the COHb saturations were the geographical location of the individual, occupation, and the existing meteorological conditions.

COMMENTS: *The most relevant finding in this report is that tobacco smoking was the most important factor responsible for high COHb saturations observed in the study population. (PJA)*

314. Stewart, R.D. The effect of carbon monoxide on humans. Annu Rev Pharmacol 15:409-23, 1975.

COMMENTS: *This article provides a good overview of what was known in 1975 about the effects carbon monoxide on humans. (PJA)*

315. Stewart, R.D. Proceedings: The effect of carbon monoxide on humans. J Occup Med 18(5):304-9, 1976.

COMMENTS: *Though now 20 years old, this a well-written review of the effects of carbon monoxide on humans. (PJA)*

316. Strobel, M. and Gsell, O. [Mortality in relation to tobacco smoking. 9 years of observations of physicians in Switzerland]. Helv Med Acta 32(6):547-92, 1965.
317. Svensson, H., Vedin, A., Wilhelmsson, C. and Andersson, G. Low-back pain in relation to other diseases and cardiovascular risk factors. Spine 8(3):277-285, 1983.

ABSTRACT: The relationship of low-back pain (LBP) to other diseases and to cardiovascular risk factors was studied in a random sample of 940 men from 40 to 47 years of age. The life-time incidence of LBP was 61%, the prevalence 31%. The prevalence of other diseases was the same as in previous studies in the same region. In a univariate analysis nine variables were found to be correlated to LBP; angina pectoris, calf pain, breathlessness on exertion, smoking, physical activity at work and during leisure time, worry and tension, fatigue at the end of the workday, and perception of stress. When the influence of other variables was assessed by analysis of covariance, four of the variables maintained a direct association with LBP, viz, calf pain on exertion, smoking, a high physical activity at work, and a frequent feeling of worry and tension.

COMMENTS: *Smoking and a frequent feeling of worry and tension were both associated with low back pain even when controlling for other factors. For the group who had ever experienced low back pain, 44.3 % smoked vs. 38.1% of those who never experienced back pain. (JAB)*

318. Tate, J.C., Pomerleau, O.F. and Pomerleau, C.S. Temporal stability and within-subject consistency of nicotine withdrawal symptoms. J Subst Abuse 5(4):355-63, 1993.

ABSTRACT: This study tested the temporal stability and within-subject consistency of the Diagnostic and Statistical Manual-III-R (DSM-III-R) nicotine withdrawal symptoms in 39 (21 female, 18 male) regular smokers. Subjects provided withdrawal symptom ratings while smoking ad libitum and during two 48-hour abstinence periods that were separated by 1 week. All but two symptoms, increased eating and hunger, demonstrated adequate temporal stability (i.e., stability coefficients $>$ or $=$.70). Within-subject consistency was found for impatience, anxiety, difficulty concentrating, and irritability. The total (average) score emerged as the most stable and consistent indicator of withdrawal. Results of a cluster analysis suggest the presence of two groups of smokers based on the withdrawal experience. Possible reasons for variability in nicotine withdrawal symptom reports are discussed.

319. Theilig, C., Bernd, A., Ramirez-Bosca, A., et al. Reactions of human keratinocytes in vitro after application of nicotine. Skin Pharmacol 7(6):307-15, 1994.

ABSTRACT: Nicotine is rapidly taken up by human keratinocytes (HaCaT cells) and after 3 h the uptake is approximately 50% of maximum. Cotinine, a metabolite of nicotine, was detected, thus demonstrating the metabolism of nicotine in HaCaT cells. Low nicotine concentrations (0.1-200 micrograms/ml) did not influence the incorporation rate of thymidine into DNA or amino acids into proteins. Inhibition of DNA and protein synthesis was only observed at concentrations $>$ 200 micrograms/ml. After application of 400 micrograms/ml nicotine, the cells were vacuolated. This process was reversed after nicotine withdrawal. At low nicotine concentrations, no changes in microtubules and actin filaments could be detected. However, in the presence of nicotine (1-10 micrograms/ml), keratin filaments showed a more orderly pattern than controls, and the expression of the suprabasal keratins 1 and 10/11 was induced and increased according to the concentration of nicotine. The number of cornified envelopes also increased markedly. Nicotine concentrations $>$ 100 micrograms/ml led to a disarrangement of keratin filaments and to a decrease in keratin expression and cornified envelope formation. Our results suggest that nicotine at concentrations up to 100 micrograms/ml is not an irritant but may induce cornification of the skin.

320. Thomson, M.R., Garito, M.L. and Brown, F.H. The role of smoking in periodontal diseases: A review of literature. Periodontal Abstracts 41(1):5-9, 1993.

ABSTRACT: The authors reviewed the current literature regarding the effects of smoking on various aspects of the periodontal disease process. Several studies found that cigarette smoking reduced gingival blood flow. Another study found that cotinine (nicotine metabolite) was present in the saliva and gingival crevicular fluid of all smoker subjects and completely absent from all non-smoker subjects. Other studies found that cigarette smokers had significantly more alveolar bone loss than pipe or cigar smokers. Two studies reported that chemotaxis of PMNs from smokers was suppressed relative to non-smokers which may be due to the presence of toxic substances during the gas/vapor phase of smoking. A considerable body of evidence appeared to support that smoking increases the severity of periodontal diseases and has a detrimental effect on the healing process after surgery.

COMMENTS: *This review of the literature was a good report on the detrimental effects of smoking on soft tissues (KLR).*

321. Tsai, S.P., Cowles, S.R. and Ross, C.E. Smoking and morbidity frequency in a working population. J Occup Med 32(3):245-9, 1990.

ABSTRACT: As part of Shell's health surveillance program, morbidity frequency and severity by smoking status (current smoker, exsmoker, non-smoker) were compared for the 3-year period 1985 through 1987. Morbidity data for this study were extracted from the morbidity section of the Shell Health Surveillance System, which included all illness and absence events in excess of 5 days. Statistically significant positive associations were seen between smoking habits and overall morbidity, diseases of the circulatory system, and diseases of the respiratory system for both male and female employees. In addition, a significantly increased association between smoking and both nonmotor vehicle accidents and motor vehicle accidents among current smokers was noted. Current smokers had a greater than 60% higher frequency rate (P less than .05) for nonmotor vehicle accidents than non-smokers for both men and women. Male smokers also had a 75% increased (P less than .05) motor vehicle accident rate. These results suggest that it may be possible to reduce overall illness and injury morbidity through implementation of successful smoking cessation programs.

COMMENTS: *This article provides solid evidence of increased risk for injuries of all types among a group of 7863 petrochemical refinery workers. The age distribution of the subjects is similar to active duty Army populations -- perhaps somewhat older. Injury types did not seem to vary between smokers and non-smokers as much as frequency of injuries did. Approximately 50% of the nonmotor vehicle injuries were sprains and strains. The authors discuss a number of possible explanations for the higher observed motor vehicle accident rates among smokers. These include distraction due to cigarette manipulation, drug use among smokers, and adverse effects of carbon monoxide or nicotine on driving ability. But nonmotor vehicle injury rates were also much higher among smokers, though not with any apparent pattern. They discount the role of distraction, since smokers only smoke on breaks while working in the refinery. Physical or psychological factors could play a role, as could pharmacologic effects of nicotine on alertness and response time. Personality differences were also considered, though the reduction in injury rates among former smokers at least weakens that argument. The potential confounding effects of alcohol use could not be controlled in their study. The potential for education and socioeconomic status to confound the results was also considered. To address this they evaluated a subgroup of men paid hourly, but could not demonstrate any difference. (PJA)*

322. Tsai, S.P., Gilstrap, E.L., Cowles, S.R., Waddell, L.C., Jr. and Ross, C.E. Personal and job characteristics of musculoskeletal injuries in an industrial population.

J Occup Med 34(6):606-12, 1992.

ABSTRACT: A cross-sectional study was conducted of 10,350 full-time regular employees who worked at Shell Oil Company's manufacturing facilities between 1987 and 1989. Two hundred seventy-five employees with low-back and 456 with non low-back musculoskeletal injuries were compared with 8295 employees who did not have musculoskeletal injuries during this period. Based on morbidity data collected from a prospective health surveillance system, this study shows that estimated relative risks (RRs) for low-back injuries are significantly higher among smokers (RR = 1.54, P less than .01) and overweight persons (RR = 1.42, P less than .01). This observation is also true for non low-back musculoskeletal injury (RR = 1.23, P = .05 for smokers and RR = 1.53, P less than .01 for overweight persons). In addition, persons in potentially more physically demanding jobs (primarily maintenance job titles) had an increased RR for both low-back and non low-back musculoskeletal injuries (RR = 1.57, P less than .01 and RR = 1.35, P = .02, respectively). The findings of this study suggest that it may be possible to reduce the impact of musculoskeletal injury through implementation of an integrated injury prevention program. Such programs would include not only the traditional elements of job factors evaluation and modifications, employee education and training, and an overall increased attention to ergonomics but also medical counseling and support for personal fitness programs, workplace smoking cessation programs, and weight-reduction programs.

323. Tuovinen, V., Vaananen, M., Kullaa, A., et al. Oral mucosal changes related to plasma ascorbic acid levels. Proc Finn Dent Soc 88(3-4):117-22, 1992.

ABSTRACT: The role of vitamin C in maintaining mucosal health is poorly documented. The purpose of this study was to examine the presence of oral mucosal lesions in subjects with low ascorbic acid (AA) levels in plasma. AA plasma levels of 843 working elderly people in six rural villages in Eastern Finland were determined. All subjects with low plasma AA levels (< or = 25 μ mol/l) (n = 106) formed the study group. Controls with normal AA levels (> or = 50 μ mol/l) (n = 103) were drawn from the same population. They were matched for age, sex and number of teeth. Oral mucosal lesions in all subjects were recorded clinically using a double-blind method in all subjects. Petechias, leukoplakia and lichenoid lesions were the commonest lesions of the oral mucosa. Only in leukoplakia there was a statistically significant difference between the groups ($p < 0.01$). Smokers had more leukoplakia than non-smokers. The prevalence of leukoplakia was higher when smoking was combined with AA deficiency.

324. van Antwerpen, L., Theron, A.J., Myer, M.S., et al. Cigarette smoke-mediated oxidant stress, phagocytes, vitamin C, vitamin E, and tissue injury. Ann N Y Acad Sci 686:53-65, 1993.

325. Vessey, M.P., Villard-Mackintosh, L. and Yeates, D. Epidemiology of carpal tunnel syndrome in women of childbearing age. Findings in a large cohort study. Int J Epidemiol 19(3):655-9, 1990.

ABSTRACT: There are few epidemiological data in the scientific literature about the carpal tunnel syndrome. This paper describes the characteristics of the 154 women referred to hospital for management of this condition among the 17,032 taking part in the Oxford-Family Planning Association contraceptive study. Standardized first referral rates for carpal tunnel syndrome doubled as age increased from 25-29 to 50 or more, tripled as smoking increased from zero to 25 or more cigarettes per day, doubled as total duration of oral contraceptive use increased from zero to ten years or more and doubled as Quetelet's obesity index (weight(g)/height(cm)²) increased from up to 1.99 to 2.6 or more. All these trends were statistically significant. Carpal tunnel syndrome was also found to be positively associated with a history of menstrual disorders, gastrointestinal tract symptoms and various orthopedic conditions. The findings on cigarette smoking are of particular interest but require confirmation or refutation in another

study before firm conclusions can be drawn.

326. Wald, N.J., Idle, M., Boreham, J. and Bailey, A. Serum cotinine levels in pipe smokers: evidence against nicotine as cause of coronary heart disease. Lancet 2(8250):775-7, 1981.

ABSTRACT: Serum levels of cotinine (a principal metabolite of nicotine) were studied in men who did not smoke (28), and in men who smoked cigarettes only (150), cigars only (70), and pipes only (56). The mean cotinine level for pipe smokers was 389 ng/ml, significantly higher than the mean level for cigarette and cigar smokers (306 and 121 ng/ml, respectively); no cotinine was detected in the serum from any of the non-smokers. Large prospective studies have shown that pipe smokers have no material excess risk of coronary heart disease but cigarette smokers do, so that our observations indicate that nicotine is unlikely to be the major cause of the excess coronary heart disease mortality in cigarette smokers.

327. Waldron, I. and Johnston, S. Why do women live longer than men? J Human Stress 2(2):19-30, 1976.

ABSTRACT: In the contemporary United States, males have 60 percent higher mortality than females. In Part I, published in the previous issue, we showed that 40 percent of this sex differential in mortality is due to a twofold elevation of arteriosclerotic heart disease among men. Major causes of higher rates of arteriosclerotic heart disease in men include greater cigarette smoking among men; probably a greater prevalence of the competitive, aggressive Coronary Prone Behavior Pattern among men; and possibly a protective role of female hormones. In addition, men have higher death rates for lung cancer and emphysema, primarily because more men smoke cigarettes. In Part II we analyze the other major causes of men's higher death rates: accidents, suicide, and cirrhosis of the liver. Each of these is related to behaviors which are encouraged or accepted more in men than in women in our society--for example, using guns, being adventurous and acting unafraid, working at hazardous jobs and drinking alcohol. We conclude with suggestions for reducing male mortality; for example, by changing the social conditions which foster in men the behaviors that elevate their mortality.

328. Waldron, I. Sex differences in human mortality: the role of genetic factors. Soc Sci Med 17(6):321-33, 1983.

ABSTRACT: This paper reviews evidence concerning genetic factors that influence sex differences in human mortality, with attention to the interactions between genetic and environmental factors. Some widely quoted earlier conclusions, for example, that males have consistently higher fetal mortality than females, are not supported by current evidence. For example, for late fetal mortality, males had higher rates than females in earlier historical data, but not in recent data for several advanced industrial countries. This reflects a changing balance between an inherently greater female vulnerability for one major type of late fetal mortality and inherently greater male vulnerability for several other types of late fetal mortality that have declined in importance as health care has improved. Males appear to be inherently more vulnerable than females to infant mortality, although the causes of this vulnerability are poorly understood. X-linked immunoregulatory genes appear to contribute to greater female resistance to infectious diseases. Despite these apparent inherent advantages for females, in some situations females have had higher infant mortality and higher infectious disease mortality than males, apparently due to environmental disadvantages for females, such as less adequate diet and health care. Inherent sex differences in reproductive physiology and anatomy contribute to higher female mortality for breast cancer and maternal mortality. For these causes of death, as for the other categories discussed, the death rates and thus the contributions to sex differences in total mortality vary considerably depending on environmental conditions. Several hypothesized contributions of sex hormones to sex differences in mortality are at present controversial due to contradictions and limitations in the available data. There may be effects of

male sex hormones on sex differences in behavior which contribute to males' higher death rates for accidents and other violent causes. Women's endogenous sex hormones may reduce women's risk of ischemic heart disease. For both violent deaths and ischemic heart disease it appears that any genetic contributions to sex differences in mortality are strongly reinforced by the cultural influences that foster more risky behavior in males, including more use of weapons, employment in hazardous occupations, heavy alcohol consumption and cigarette smoking. It appears that these cultural influences on sex differences in behavior are widespread cross-culturally in part because of the effects of inherent sex differences in reproductive functions on the cultural evolution of sex roles. These examples illustrate the complexity and importance of interactions between genetic and environmental factors in determining sex differences in human mortality.

329. Waller, J.A. On smoking and drinking and crashing [editorial]. N Y State J Med 86(9):459-60, 1986.

COMMENTS: *This commentary focuses on the relationship between smoking and MVAs and points out that smokers who tend to be drinkers may confound this relationship. However, the author points out that smokers who do not drink are still at increased risk for an MVA. The author suggests that it may be a "devil-may-care" attitude that is responsible for this association. Smokers may take risks in other aspects of their life, including driving.* (JAB)

330. Warburton, D.M. The reality of the beneficial effects of nicotine [comment]. Addiction 89(2):138-9; 144-6, 1994.

331. Weinstein, N.D. Effects of personal experience on self-protective behavior. Psychol Bull 105(1):31-50, 1989.

ABSTRACT: This article seeks to further our understanding of self-protective behavior by examining the effects of a particularly powerful stimulus to action: personal experience. It reviews the effects of automobile accidents on seat belt use, criminal victimization other than rape on individual crime prevention efforts, natural hazards experience on both natural hazards preparedness and compliance with evacuation warnings, and myocardial infarction on smoking. Theories suggesting mechanisms that could link personal experience to behavior are described, and data concerning the effects of experience on some key variables in these theories are discussed. Tentative propositions are offered to resolve the many apparent discrepancies in this literature. These propositions concern the effects of experience on risk perceptions, the influence of experience on risk salience, the specificity of responses to victimization, and the duration of experience effects.

332. Wesnes, K. and Warburton, D.M. Smoking, nicotine and human performance. Pharmacol Ther 21:189-208, 1983.

COMMENTS: *This lengthy article presents considerable evidence of several human performance improvements from nicotine. If one accepts their methodology, then one might be inclined to believe that smoking or nicotine improves mental efficiency, vigilance, rapid information processing, and perhaps even learning. However, only smokers are tested, and it is suggested in the article that the best subjects are not only habitual smokers, but those who smoke regularly throughout the day. Without any true control groups it is difficult to accept some of their assertions.* (PJA)

333. Wesnes, K. and Warburton, D.M. Effects of scopolamine and nicotine on human rapid information processing performance. Psychopharmacology 82:147-150, 1984.

ABSTRACT: In the first experiment, after a 10-min baseline test on a rapid information processing task,

subjects received oral doses of either placebo, methscopolamine 1.2 mg, scopolamine 0.6 mg or scopolamine 1.2 mg, and 1 h later performed the task again for a 20-min period. Following scopolamine 1.2 mg, correct detections were significantly lower over the 20-min period, whereas no such decrement was observed in the other three conditions. In the second experiment a similar design was used to study the effects of nicotine 0.5 mg, 1.0 mg and 1.5 mg and placebo, except that post-drug testing was carried out 10 min after baseline due to the faster absorption of nicotine. Nicotine helped prevent both the decline in detections and the increase in reaction time which occurred over time in the placebo condition. These findings indicate that compounds with opposite effects on central cholinergic pathways produce opposite effects on the performance of a task involving rapid information processing, and are consistent with previous findings from this laboratory.

COMMENTS: *This study, using only 9 non-smoking subjects, provides evidence that nicotine, in certain doses, can improve performance on tasks requiring rapid information processing -- though the results were not very convincing. (PJA)*

334. West, R. Beneficial effects of nicotine: fact or fiction? [editorial] [see comments]. Addiction 88(5):589-90, 1993.

COMMENTS: *The question of whether nicotine has beneficial effects is central to why people smoke, their ability to quit, and their susceptibility to illness and injury. West writes in this provocative editorial, "Many smokers believe that cigarettes enhance their lives or at least they help them to cope with life's demands...there is as yet no clear scientific evidence to support this." West calls for a thorough evaluation of the existing literature with a systematic comparison of all features of the studies, including the characteristics of the subjects, the type of measures used, the method of nicotine delivery, the timing of the measures, the possible influence of the experimental situation and subject expectancies, and even the preconceptions of the experimenters. The focus should be on measures of mood and performance that could conceivably be of benefit to smokers. See comments by : Henninfeld, Foulds, Warburton, Richmond, Spilich, Parrott, and West in Addiction (vol. 88, pp. 589-590, May 1993). (PJA)*

335. West, R. and Gossop, M. Overview: a comparison of withdrawal symptoms from different drug classes. Addiction 89(11):1483-9, 1994.

ABSTRACT: Whereas early formulations of addictive behavior placed great emphasis upon withdrawal as a defining feature, current views focus more upon compulsive use as its central characteristic. However, the withdrawal syndrome continues to occupy an important place in the study of the addictions. It is interesting both in its own right and in relation to the development and maintenance of the compulsive use of drugs. Despite the attention devoted to withdrawal phenomena over many years, precise demarcation of the withdrawal symptoms associated with drugs of dependence has proved difficult to achieve. Withdrawal from all drugs of dependence appears to lead to mood disturbances although the extent to which these are due to the pharmacological actions of the drugs or to other physiological or psychological processes is unclear. Sleep disturbance is also common, although again direct links with the pharmacological actions of the withdrawn drug are yet to be established. Withdrawal from alcohol, benzodiazepines and opiates is often associated with somatic symptoms. In the former two cases, these can involve sweating, tremor and occasionally seizures. Perceptual disturbances have also been reported. In the case of opiates, flu-like symptoms are often reported, including muscle aches and gastric disturbances. In the case of nicotine, heightened irritability has been established as a direct pharmacological withdrawal effect. Characterization of stimulant withdrawal is still uncertain. There is little evidence of somatic symptoms but depression may occur as a result of a physiological rebound. There is also uncertainty over what role pharmacological withdrawal symptoms play in maintaining compulsive use. Further advances in our understanding of the nature and significance of withdrawal symptoms will depend on using precise operational definitions of features of withdrawal.

COMMENTS: *Symptoms of nicotine withdrawal include anxiety, craving, depression, increased appetite, irritability, poor concentration, restlessness, sleep disturbance, and weight gain. The basic symptoms can last up to 4 weeks; craving, hunger, and weight gain can last considerably longer. None of these symptoms would be desirable for soldiers in battle, operating equipment or vehicles, and any could be suspect as a contributor to injury risk. (PJA)*

336. West, R. Beneficial effects of nicotine: reprise. Addiction 89:144-146, 1994.

337. Westphal, K.A., Friedl, K.E., Sharp, M.S., et al. Health, performance, and nutritional status of U. S. Army women during Basic Combat Training. Natick, MA: U.S. Army Research Institute of Environmental Medicine, ARIEM T96-2, 1995.

ABSTRACT: This USARIEM study was undertaken to examine the relationship(s) between health, nutrition, body composition, and physical performance in female soldiers during the 8 weeks of basic combat training (BCT). The study investigated female soldiers assigned to three platoons within a single all-female basic training company over the period of 22 March 1993 to 20 May 1993 at FT. Jackson, South Carolina. Volunteer soldiers participated in pre-training (pre-BCT; 174 original volunteers with a mean age of 21.4 yrs) and post-training (post-BCT; 158 successful BCT graduates) performance and body composition testing, as well as three separate blood draws (pre-BCT, midpoint of BCT, and post BCT). Additionally, a 7 day dining facility dietary assessment survey was performed on a subset of 49 randomly selected soldiers during the second week of training. Questionnaires were utilized to acquire demographic information, as well as to assess nutrition knowledge and beliefs and food attitudes.

COMMENTS: *Trainees who smoked before BCT were at significantly greater risk for injury when compared to non-smokers (RR=1.25, p=0.045, X2). Soldiers who reported drinking alcohol prior to BCT also showed a significant trend for higher time-loss injury risk with increasing frequency (days/week) of consumption (RR=1.71, p=0.023, Chi square for linear trend). See also Reynolds Abstract, 1996. (PJA)*

338. Wetter, D.W. and Young, T.B. The relation between cigarette smoking and sleep disturbance. Prev Med 23(3):328-34, 1994.

ABSTRACT: BACKGROUND. There is little epidemiological or clinical information on the relation between smoking and sleep disturbance, despite evidence suggestive of a relationship. The present study tested the hypothesis that cigarette smoking is associated with sleep disturbance. METHODS. Survey data from 3,516 adults were collected as part of a longitudinal, epidemiologic study of sleep-disordered breathing. Symptoms of insomnia, hypersomnia, and parasomnia were assessed using diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders (3rd ed., revised). RESULTS. Among both males and females, smoking was associated with difficulty initiating sleep, and difficulty waking up. Excessive daytime sleepiness was related to smoking only for females while nightmares and disturbing dreams were related to smoking only among males. CONCLUSIONS. Smoking was associated with difficulty initiating sleep and with a constellation of symptoms suggestive of sleep fragmentation. Sleep disturbance may be more prevalent among smokers due to the stimulant effects of nicotine, nightly withdrawal, an increased prevalence of sleep disordered breathing relative to non-smokers, and/or an association with psychological disturbance. These results have important clinical and public health implications for reduction of the disease and disability associated with smoking and sleep disturbance.

339. White, G.L., Jr., Pedersen, D.M., Wood, S.D., Warden, D.R. and Thiese, S.M. Cigarette smoking and combat injuries [editorial]. Mil Med 153(7):381-2, 1988.

COMMENTS: *The main premise of this editorial is that smoking interferes with wound healing and is therefore of major concern for the military. Cigarette smoke contains 3%-6% carbon monoxide leading to*

the formation of carboxyhemoglobin (COHb) -- the poisoning of 10%-15% of a smoker's hemoglobin. Non-smokers usually have COHb levels of 0.5% - 1.0%. Cigarette smoke also contains a number of other harmful substances such as hydrogen cyanide and nitrous oxide. Smoking reduces 2,3-diphosphoglycerate resulting in a decrease in oxygen unloading at the cellular level. Cigarettes also contain from 0.1 to 3.0 mg of nicotine. Nicotine, in addition to its psychomotor influences, causes increases in heart rate, blood pressure, cardiac output, coronary blood flow, as well as cutaneous vasoconstriction. Cigarette smoking also increases platelet adhesiveness, possibly resulting in stroke. Decreases in vitamins A, E, C, and B complex have also been reported and are important in the wound healing process. The purpose of the author's commentary was to evaluate the role of smoking on combat wounds. However, these same factors may be just as important for the day-to-day bone and soft tissue repair. Perhaps it is one of these factors that accounts for the higher overuse injury rates seen among various military training populations. (PJA)

340. White, D.J. Musculoskeletal Disorders Related to Cigarette Smoking and Tobacco Use. School of Public Health, Boston University, Boston, 1995.

ABSTRACT: Musculoskeletal disorders commonly occur and result in considerable disability. The identification of a modifiable risk factor for musculoskeletal disorders is of public health importance. This dissertation examined the occurrence of musculoskeletal disorders and their association with cigarette and tobacco use. The first study used a cross-sectional design to assess the relationship of musculoskeletal shoulders disorders with cigarette and tobacco use in 1291 automotive manufacturing workers. Sixteen percent of the workers reported shoulder symptoms in the previous year, while 37% had signs of a shoulder disorder on physical examination. In multivariate logistic regressions controlling for age, gender, workplace ergonomic stressors and other covariates, current and former smokers had odds ratios of 1.46 and 1.20 for symptoms and 1.46 and 1.27 for signs of shoulder disorders, respectively, as compared to never smokers. A statistically significant dose-response was found for pack-year history and the number of cigarettes currently smoked per day on the prevalence of shoulder disorders. The second study prospectively followed 198 senior military officers for ten months to evaluate the incidence of musculoskeletal disorders as reported in their medical records among current, former and never cigarette and tobacco user. Twenty-eight percent of the subjects had one or more disorders, with 43% of those disorders affecting the lower extremities. Muscle strains, ligament strains, and tendonitis were the most common diagnoses. After adjusting for age, body mass index, maximum oxygen uptake, activity level and drinks per week, current smokers had odds ratios of 2.31 for any body region and 10.70 for lower extremity musculoskeletal disorders compared to never smokers. Former smokers had intermediate values. The third study examined the effect of cigarette and tobacco use on the frequency of musculoskeletal disorders during the previous 5 years among 178 senior military officers. The annualized rate of musculoskeletal disorders to any body region and to the lower extremities was 27.8 and 11.6 per 100 person-years, respectively. There was no statistically significant association between cigarette and tobacco use and the rate of musculoskeletal disorders; in fact, current smokers had the lowest rates of disorders. The results of this dissertation suggested a positive association between musculoskeletal disorders and cigarette and tobacco use, that was stronger for lower than for upper extremity disorders. However, further research is needed, especially given the contrary findings of the third study.

341. Wickham, C.A., Walsh, K., Cooper, C., et al. Dietary calcium, physical activity, and risk of hip fracture: a prospective study [see comments]. BMJ 299(6704):889-92, 1989.

ABSTRACT: **OBJECTIVE:** To determine whether low dietary calcium intake and physical inactivity are risk factors for hip fracture among subjects aged 65 and over. **DESIGN:** Fifteen year follow up study of a large cohort of randomly selected elderly people living in the community, who had taken part in the 1973-4 survey of the Department of Health and Social Security, and for whom dietary and other data were recorded at initial interview and medical assessment. **SETTING:** Eight areas in Britain (England (five),

Wales (one), and Scotland (two). SUBJECTS: 1688 Subjects living in the community, of whom 1419 subjects (720 men and 699 women) agreed to participate. 1356 Subjects completed a seven day dietary record and 983 (542 men and 441 women) agreed to be assessed by a geriatrician. RESULTS: Incidence of hip fracture increased with age and was higher in women than men. Comparison with matched controls showed no evidence that the risk of hip fracture was related to calcium intake: the odds ratio for the lowest third of dietary calcium compared with the highest was 0.7 (95% confidence interval 0.1 to 3.9) after adjustment for smoking and body mass index. The adjusted odds ratio for the lowest third of outdoor activity compared with the highest was 4.3 (0.7 to 26.8), and that for grip strength was 3.9 (0.7 to 23.0). CONCLUSIONS: Reduced intake of dietary calcium does not seem to be a risk factor for hip fracture. Further evidence is provided that physical activity in the elderly protects against hip fracture.

342. Wienpahl, J., LaCroix, A., White, L., et al. Body mass index, alcohol use, and smoking in relation to hip fracture in older populations. Am J Epidemiol 132:753-754, 1990.

343. Wieslander, G., Norbäck, D., Göther, C.J. and Juglin, L. Carpal Tunnel syndrome (CTS) and exposure to vibration, repetitive wrist movements, and heavy manual work: A Case-Referent Study. British Journal of Industrial Medicine 46:43-47, 1988.

ABSTRACT: Possible connections between carpal tunnel syndrome (CTS) and exposure to vibrating handheld tools, repetitive wrist movements, and heavy manual work were examined in a case-referent study. The cases were 38 men operated on for CTS between 1974 and 1980. For each case, two referents were drawn from among other surgical cases (hospital referents) and two further referents from the population register and telephone directory, respectively (population referents). Thirty four of 38 cases (89%) and 143 of 152 referents (94%) were interviewed by telephone. An increased prevalence of obesity, rheumatoid disease, diabetes, thyroid disease was observed among the cases but most did not suffer from any of these disorders. CTS was significantly correlated with exposure to vibration from handheld tools and to repetitive wrist movements but showed a weaker correlation with work producing a heavy load on the wrist. A cause-effect relation between CTS and exposures to handheld vibrating tools and to work causing repetitive movements of the wrist seems probable. Some differences between hospital and population referents indicate that a case-referent study of this type could be biased by inappropriate selection of referents.

344. Williams, A.R., Weiss, N.S., Ure, C.L., Ballard, J. and Daling, J.R. Effect of weight, smoking, and estrogen use on the risk of hip and forearm fractures in postmenopausal women. Obstet Gynecol 60(6):695-9, 1982.

ABSTRACT: From the practices of approximately two thirds of the orthopedic surgeons in King County, Washington, the authors identified white women ages 50 to 74 who had sustained a fracture of the hip or forearm between 1976 and 1979. The women were interviewed concerning factors associated with levels of endogenous estrogens. Their responses were compared to those of a random sample of white female residents of King County in the same age range. The risk of hip fracture was elevated in thin women and in those who smoked cigarettes, particularly among nonusers of estrogen. Neither weight nor smoking affected the risk of forearm fracture in estrogen users, although among nonusers smoking increased the risk, particularly among those who were thin. The beneficial effect of estrogen use in preventing both types of fracture varied considerably according to the woman's weight and smoking status, being greatest in thin women who smoked cigarettes and near zero in heavy non-smokers. Body weight and cigarette smoking history offer important information concerning the probable degree of protection against fracture afforded by estrogen use.

345. Wilmore, D.W. and Pruitt, B.A. Fat boys get burned. Lancet (23 Sep):631-632,

1972.

ABSTRACT: Several at-risk groups have been associated with a high incidence of thermal trauma; those susceptible to burns include alcoholics, epileptics, retarded children, and aged people who smoke. We have reviewed anthropomorphic characteristics of children seen at a burn center to determine whether standard body measurements could identify an at-risk group predisposed to thermal trauma.

346. Wouters, F.R., Salonen, L.W., Frithiof, L. and Heiliden, L.B. Significance of some variables on interproximal alveolar bone height based on cross-sectional epidemiologic data. J Clin Periodontal 20(3):199-206, 1993.

ABSTRACT: The objective of the study was to analyze the significance of some variables on interproximal alveolar bone height, based on cross-sectional epidemiologic data from a Swedish survey conducted in 1983-1984, in the northern medical care district of Alvsborg county. 723 dentate individuals (92% of the randomly selected dentate individuals) with complete anamnestic, clinical and radiographic documentation were included in the statistical analyses. The computerized method used to measure interproximal alveolar bone height as a % of root length (B/R) provided data at each measurable interproximal surface of the individual teeth. On the population basis, a multivariate linear regression analysis showed that: (i) mean B/R values did not differ significantly between men and women, (ii) B/R value decreased with increasing age at a linear rate of 0.26% (0.04 mm) per year of age, (iii) the higher the calculus index value, the lower the mean B/R value, (iv) the higher the plaque index value, the higher the mean B/R value, (v) level of education, dentist attendance frequency and prevalence of defective margins of dental restorations did not show any statistically significant association with B/R, (vi) individuals attending the dental hygienist less than once every 2 years had higher mean B/R value than individuals attending the dental hygienist at least once every two years, and (vii) current smokers exhibited significantly lower mean B/R value than former and non-smokers. Individuals smoking more than 5 g of tobacco per day had lower mean B/R values than individuals smoking between 1 and 5 g of tobacco per day. There was no statistically significant relationship between snuffing and B/R.

347. Wright, G., Randell, P. and Shephard, R.J. Carbon monoxide and driving skills. Arch Environ Health 27(6):349-54, 1973.

ABSTRACT: Eighty milliliters of carbon monoxide (CO) or 80 ml of air was administered double blind to 50 adults (32 men, 18 women). Blood carboxyhemoglobin (COHb) levels increased by 3.4% in those receiving CO. Brake reaction time, night vision, glare vision, glare recovery, hand steadiness, and depth perception all showed small and individually insignificant deterioration in the group receiving CO; grouping data in a non-parametric analysis, the performance difference became significant ($P < .005$). During operation of a driving simulator, the CO exposed group a highly significant deficit in "careful driving" skills ($P < .005$), with a statistically insignificant facilitation of emergency type movements. Since a 3.4% increase in COHb level is sufficient to prejudice safe driving, there is a need to revise the permitted eight hour industrial CO exposure level of 50 ppm.

348. Young, P. Smoking and the young. Br J Nurs 1(13):648-51, 1992.

ABSTRACT: Over one quarter of the risk of death due to the sudden infant death syndrome (cot death) is attributable to maternal smoking. Maternal smoking during pregnancy and infancy is one of the most important avoidable risk factors for infant death. Nicotine is a drug of addiction. Many young smokers are addicted to nicotine and develop withdrawal symptoms on stopping. Smoking is an important marker for other types of drug abuse, e.g. alcohol, cannabis and cocaine. The earlier children start smoking, the greater the risk of lung cancer and heart disease. Smoking affects immunity and has been associated with

an increased risk of acquiring human immunodeficiency virus-1 infection.

349. Yuste, C.P., De Guevara, L. and Brihuega, M. Influencia del fumar en los accidentes laborales. Encuesta estadística. Medicina y Seguridad del Trabajo 21(84):38-46, 1973.

ABSTRACT: Se estudia estadísticamente, en una empresa automatizada de cerámica, la posible influencia del hecho de fumar en la mayor en la mayor incidencia de accidentes laborales. Para ello se buscó una relación intrínseca, en cada sección de trabajo, de las razones matemáticas entre accidentes y las poblaciones laborales. Se demuestra una relación positiva "accidente-pitillo" en el elemento masculino, único que fuma en el puesto de trabajo. Se hace un análisis de las causas y efectos de esta verdad estadística. Los datos estadísticos fueron recogidos en encuesta controlada sobre 254 operarios básicos, de un total de 364, durante un intervalo de tiempo de nueve meses. Se considera a este población libre de otras presiones o influencias perjudiciales.

COMMENTS: *This study evaluated the incidence of labor-related accidents among smokers in an automatic ceramic printer factory. The data were gathered in a controlled environment on 254 basic operators out of a total of 364. A positive "cigarette-accident" relationship is demonstrated in males when they smoke at work. An analysis of cause and effect is made. The incidence of labor accidents and lost time from work was approximately 2:1 for smokers. (Ramos/PJA)*

350. Zargarian, A. [The characteristics of injuries among tobacco growers of the Shamshada Region of the Armenian SSR]. Zh Eksp Klin Med 7(1):94-7, 1967.

351. Ziedonis, D.M., Kosten, T.R., Glazer, W.M. and Frances, R.J. Nicotine dependence and schizophrenia. Hosp Community Psychiatry 45(3):204-6, 1994.

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